INDUSTRIAL ARTS and VOCATIONAL EDUCATION

VOL. 29 OCTOBER, 1940 No. 8

Kindly Remember

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION will gladly publish news notes about the individual teacher, his professional activities, happenings at his school, changes in his school shop or in his courses, promotions and changes of employment, and his association meetings.

Letters from our readers show that the columns on Association News, Personal News, Summer School News Notes, and News Notes, are read with great interest.

This type of news is not obtainable unless those directly interested send in the items. Please help the magazine keep a continuous record of the events occurring in the fields of industrial arts and vocational education.

The November Issue

As announced last month, the November issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION will be entirely given over to problems and projects. It is hoped that these will be of real use to our many readers who are actively engaged in teaching shopwork.

The A.V.A. Convention

In the Association News column, attention is called to the next convention to be held by the American Vocational Association, at San Francisco, December 16–18. While these dates are still several months hence, it is well to plan for attendance right now. Present conditions make the A.V.A. convention especially important this year.

CONTENTS

Co-ordinating Local National Defense Programs in Vocational Education, *by John T. Shuman* ... 305
A School Hobby Program, *by R. L. Harrington* ... 306
Industrialism and Adult Education, *by Burl Neff Osburn* ... 310
Follow-up, *by R. A. Hinderman* ... 312
The Vitalized Industrial-Arts Curriculum, *by Otto A. Hankhammer* ... 314
Born in the Brain, *by Dean M. Schweickhard* ... 317
Editorials ... 318
Translating a Philosophy into Practice, *by Harry A. Jones* ... 320
The Relation of the Furniture of the Roman Empire to the Periods that Followed, *by August E. Epifania* ... 321
Dress up your Mechanical-Drawing Room, *by Edgar Farr Russell* ... 323
Archery in the School, *by Charles E. Korn* ... 324
Open-Air Shop, *by E. C. Nash* ... 326

Problems and Projects

American Standard Bolts and Nuts ... 327
Inclined Letter Alphabet, *by Oliver Schade* ... 329
A Useful Forming Block, *by George A. Smith* ... 331
Hall-Tree Hook, *by A. H. Thalman* ... 331
Related Work Topics — General Metal, *by W. H. Bowers* ... 331
Copperplating Tin-Can Projects, *by Chris H. Groneman* ... 331
Alphabet for the Architectural Drafting Room, *by W. Ben Hunt* ... 332
Shop Display Case and Cabinet, *by G. Wesley Ketcham* ... 332
The Sandpaper Problem, *by Paul I. Hauserman* ... 333
A Modern Bookcase, *by Roland Bacon* ... 333
Window Stop, *by Carl Engelbach* ... 334
Electric Concentration Game, *by E. A. Rerucha* ... 334
Indian Flageolet or Love Flute, *by Ben Hunt* ... 336
Handy Brush Containers for the Finishing Room, *by R. C. McNabb* ... 337
Teaching Ceramics in a 20 Sq. Ft. Space, *by Donald G. Brossman* ... 338
Rafter Demonstration Model, *by Keith Hinchcliff* ... 339
Bench Stool, *by C. W. Mikulasek* ... 340
Architectural Models, *by G. A. Jester* ... 340
Electrical Test and Demonstration Board, *by Clifford L. Yard* ... 342
Printing Teachers Give Views in Symposia, *by R. Randolph Karch* ... 343
Wiring Kits for the Stock Room, *by Russell J. Hunt* ... 345
Metal Milk-can Perforator, *by Clarence J. Swahn* ... 346

Answers to Questions ... 346
New Publications ... 346
Personal News ... 18A
Association News ... 20A
Summer-School Notes ... 22A
News Notes ... 25A
Shop Equipment News ... 26A

Articles Indexed — The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

Entered Jan. 2, 1914, as second-class mail matter at Milwaukee, Wis., under Act of March 3, 1879. Copyright 1940, by the Bruce Publishing Co. Title registered as Trade Mark in U. S. Patent Office, Nov. 25, 1930. Published monthly except during July and August.

Subscription Information — Subscription price, $2.50 per year, payable in advance. Canadian postage, 50 cents, foreign countries, 50 cents. Copies not over three months old, 35 cents; more than three months, 50 cents. Notice for discontinuance of subscriptions must reach Publication Office in Milwaukee, at least fifteen days before date of expiration. Changes of address should invariably include old as well as new address. Complaint of nonreceipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

Editorial Contributions — The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

The Magazine is on sale at Brentano's, New York; Wanamaker's, Philadelphia; Brentano's, Chicago; Phillippine Education Co., Manila, P. I.

PUBLISHED MONTHLY, EXCEPT DURING JULY AND AUGUST, BY THE BRUCE PUBLISHING COMPANY, 540 NORTH MILWAUKEE STREET, MILWAUKEE, WISCONSIN

Eastern Office: W. 42nd St., New York, N. Y. — Western Office: 66 E. South Water St., Chicago, Ill.
Pacific Office: 580 Market St., San Francisco, Calif.

SAFE • HEAVY • STRONG

J-31 JOINTER

To be an effective teaching aid, a shop tool must be modern. The Yates-American J-31 Jointer is modern to the minute in every respect. It is refreshingly new in appearance . . . every late development which would increase its operating efficiency has been incorporated in its design.

The base has strictly modern lines . . . smooth flowing curves . . . surfaces that shed dirt rather than collect it. This machine is so distinctly attractive in appearance that many instructors say it spurs students on to do better work.

Modern in appearance, the J-31 Jointer is just as modern in design. As a result, you'll find that this machine will produce work of excellent quality. Pull or drag is reduced and less pressure is required on the stock.

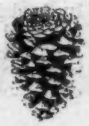
The J-31 Jointer meets all modern standards of safety. All moving parts are fully enclosed. The cutterhead is covered at both the front and rear.

Six different table sizes are available: three lengths, 36, 42 and 50 inches—two widths, 6 and 8 inches. Select the one that fits your shop or your budget. Furnished with direct motor or belted motor drive. Specify this machine when ordering new equipment. Write now for complete information.

YATES-AMERICAN MACHINE COMPANY • BELOIT, WISCONSIN

Short Talks on Wood

PONDEROSA PINE (*Pinus ponderosa*)



The most widely distributed of any member of the pine family. Formerly known as Western Yellow Pine. The wood is strong, light, and soft-textured. Has a straight, close, uniform grain, and is comparatively free from resin. Nails well, is easily worked and is highly receptive to paints, enamels and other finishes. Warps and shrinks very little. Light in color.

Extensively used for sash, doors, frames, siding, moulding, knotty paneling, and exterior and interior finish. Large quantities are consumed in the manufacture of boxes and crates. Also used for wood novelties, toys, caskets and special cuttings.

Ponderosa Pine is found from southern British Columbia south through the region west of the Rocky Mountains to northern Mexico. In the north it breaks over the Continental Divide as far east as the Black Hills. Grows in open, park-like forests on dry or moist soils. Demands much light.

A very large tree which sometimes grows to a height of 200 feet and diameters of 3 to 5 feet. The short, thick, forked branches generally turn upward at the ends and form a regular, spire-like open crown.

The bark is yellowish-brown. The leaves (needles) are three in a cluster, and mostly 5 to 8 inches long. These clusters are massed at the ends of naked twigs and remain on the tree about 3 years. The cones are 3 to 5 inches long, oval-shaped, reddish-brown, with stout recurved prickles on the scales.

This is the nineteenth of a series of brief articles dealing with various woods, their properties and uses. It is our hope that they might make interesting and helpful classroom material. We will welcome your suggestions as to the species of wood you would like featured in this series.

YATES-AMERICAN

INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

VOL. 29 OCTOBER, 1940 No. 8

Coordinating Local National Defense Programs in Vocational Education

JOHN T. SHUMAN
Williamsport, Pennsylvania

In many sections of the United States the public vocational school is the only large and reliable source for the training of skilled mechanics of all types. An adequate community vocational school takes its configuration from its community industries. If an emergency in industrial production or personnel faces the industries a year hence, an emergency in training faces the school immediately. And this is exactly the *spot* in which the school now finds itself.

During the next several years we shall probably be in a very highly competitive labor market from the employer's viewpoint, and many men will be hired who would not be employed in a more normal situation. Because of this it is important that we keep in mind that we are not selling vocational education only during the emergency, but that we are now selling it also for many years after the emergency. The reputation that is made now will live with us for many years.

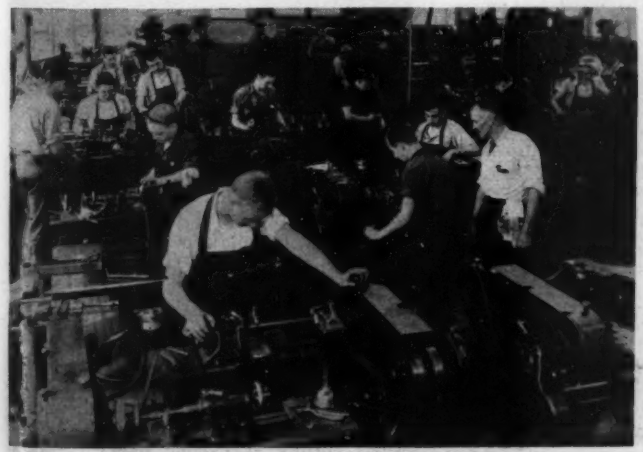
Employment managers are beginning to have a number of acute *headaches*, which the vocational director and co-ordinator can help relieve by good procedure and skillful techniques. In this article are indicated a number of things to which local vocational educators might well pay heed to the mutual benefit of school and industry.

Blueprint reading to lay the basis for future skills

The Selection of Students and Future Workers

Different schools are utilizing various methods of selecting students. That other governmental agencies, such as the WPA and the state employment services are first selecting the men to be referred to the schools in many communities, relieves the school of no part of its responsibility. It is still vitally important that the school accept as students only those who can qualify, who can do the type and quality of work expected of modern industrial employees, and who are employable in the eyes of the employer. The school should, therefore, exercise in all cases final jurisdiction over the acceptance of applicants for training, regardless of the agency referring them. It should surrender no part of its authority to do this.

Some districts are utilizing tests of various kinds; others have drawn up certain specifications as to education, past work experience, etc.; still others have established a few objective standards on which to base the selection of students for emergency training under the National Defense Program. Certainly every district operating a program should establish qualifications or standards which applicants must meet. These qualifications should be as objective as possible. They should not be lopsided; that is, no one thing should serve as the basis for selection — tests alone should not be the criterion; work experience or education alone should not be the criterion. The qualifications required of entering students should be a combination of factors which will admit the largest number of really qualified men. Finally, these standards should be made up in the light of both local and out-of-town employment



Skilled mechanics, our first line of defense

Mechanics on the ground to keep pilots in the air

needs, and they should be placed in the hands of all cooperating and referring agencies.

The Personnel Officer

The co-ordinator or other qualified individual should be named personnel officer for this program. In his hands should be placed the responsibility for the selection, dismissal, and placement of students. He should cooperate to the fullest possible extent with instructors so that all personnel matters are handled efficiently and smoothly. Since he is responsible for not only the admission of students, but also for their dismissal, he should be free from all pressure, political and otherwise.

All recommendations, information, and records sent employers should pass over his desk.

Co-ordination with Other Governmental Agencies

Perhaps the best way to iron out difficulties between cooperating agencies, such as the WPA and the state employment office is to have a man from each governmental agency assigned as a co-ordinator or liaison officer between the agency and the school. This man might serve either part time or full time, depending upon the size of the community and of the education program. This liaison officer can be very valuable and helpful in expediting and facilitating the referral, selection, and transfer of men, and in preventing misunderstandings by securing some grasp of the problems of both organizations.

The local state employment office representative might, for example, have office hours in the school, interviewing many of the students at the school rather than chasing them to some distant point in the community for interviews, record keeping, etc. Certainly the employment office and the school should maintain the closest co-ordination in the matter of registration and placement.

Co-ordination with Industry

The bottleneck in many situations is the lack of co-ordination between industry and the school. Selection may be good, instruction may be efficient and proper, but unless effective co-ordination exists with industry much of the money spent on training will be wasted. The school can do several things to make entrance into employment easier and to relieve the strain on the plant personnel department. Here are several suggestions:

1. All students should be required to own a toolbox and an adequate set of tools after a reasonable period of time in the course.
2. All students should be required to prove American citizenship. The same documents should be required of the students in the school as will be required of them in the plant. When the student is referred to the industry the matter of citizenship will then occupy little of the time of the employment department. This has the further advantage that it insures the industry having proper proof when the student is referred, because it is often difficult to secure birth certificates within a short time.
3. Keep exact records of all students. This should include types of work done, machines worked on, etc.
4. To facilitate placement, the following device is often helpful: On the first of each month a complete list of students ready for work can be submitted to the employment managers of vital plants. The personnel director can keep such a list on his desk for ready reference. Such a list should contain such important information as hours of training, ratings of the students, comments by the instructors, and the like. Place a bright cover on the list so that it attracts attention.
5. When a student is referred to a plant, he should go ready for work, with his tools, photostat of proof of citizenship, birth certificate, and similar necessities.
6. Once a student is selected, the school assumes some responsibility for his ultimate job adjustment, if that is possible without hindering the program. All individuals will not succeed equally well and their problems will need to be studied and adjustments made so that they might succeed.

Finally, in the early stages of the development of any class, the instructor should go into the plant and observe again the requirements of the jobs for which he is to train, or he should actually work again at the job for a couple of days. There is no need to make long surveys which will never be used, but checkup surveys which will help to brush up the instructor on changes in method and standards are essential. Many schools, for example, will be starting for the first time classes in motor assembly. The standards and training required of these workmen are certainly not likely to be too familiar to the instructor unless he has lately come from the plant in which his students are to be employed.

Conclusion

All of this is a big order for industrial education, but if the National Defense Program in vocational education is to succeed, the program must be adequately and efficiently co-ordinated with all agencies and organizations involved. The school is in the middle, and an excellent program will benefit both ends.

A School Hobby Program

R. L. HARRINGTON
Fairfield Whitney School,
Everett, Massachusetts

> "The way you spend your leisure time exhibits your true character."
> — *Albert Edward Wiggam.*

A recent book published on hobbies was captioned "A Guide to Happiness." To those fortunate individuals who have acquired hobbies and developed them over a period of years, there is much truth in this caption. In our frantic search for happiness, we overlook too often an innate desire to develop some dreamed-of fancy. The absorbing interest and satisfying skill of such an accomplishment brings us truer happiness and acts as a shock absorber to the jarring perplexities of our daily labors. From a financial viewpoint the fostering of such a fancy may be less expensive than many of the activities used at present to fill our leisure time.

With the advent of the shorter workday and week we are faced with the problem of what to do with this leisure. Local organizations are awakening to this need and in many cities a favorable start has been made by organizing clubs which sponsor special hobbies among adults.

Children of junior-high-school ages are particularly susceptible to an organized hobby program. If they can be stimulated to acquire a hobby during this period it will most likely develop with them throughout their lives or be the means of acquiring other hobbies later on.

In our present changing social and economic order the supervision and training for wise and healthful use of leisure is just as essentially a part of the educational program as training in mathematics, or art, or shopwork.

Our particular school hobby program has completed three very successful years. Starting humbly and with many misgivings as an assembly contribution, it has developed into a yearly program with many organized clubs, weekly meetings, enthusiastic public and parental support, and an annual hobby show which has, in the vernacular of theater managers, box-office appeal.

Inaugurating the School Hobby Program

The entire project should be under the direct supervision of two members of the teaching staff. One member, at least, should be an enthusiastic hobbiest and the other an able organizer. Most of the actual work and much of the planning can be done by the pupils. If the proper leaders are selected, by midyear the program will be operating smoothly, and enthusiasm will be running high.

Much of the success depends upon the manner of initiating the program. October is early enough to plan the first assembly that will start the wheels moving. This event is very carefully planned and is covered in one assembly period. A suggested outline of proved value includes:

1. Short talk on values of hobbies. Briefly cover last year's program and outline the activities for the coming year.
2. One or two motion-picture reels on hobbies.
3. Display of various types of handicrafts.
4. Parade of the previous year's prize winners with their hobbies.

Local stores are glad to grant window space for advance publicity to the hobby show

The guiding hobby committee is formed as soon after this assembly as is possible, preferably the following week. By this time the leaders in each class will be known to their teachers.

One boy and one girl is selected by the home-room teacher to serve on the general hobby committee. As this room committee is responsible for the success or failure of their particular room or club, it is necessary that its membership be carefully chosen.

At the organization meeting of the hobby committee, appoint or elect a secretary. The other officers can be elected at a later meeting when the committee is better known. The secretary will keep a record of attendance and also the minutes of each meeting.

At the first meeting, supply each member with a mimeographed list of suggested hobbies. Outline in detail the entire program including the final hobby show. The specific task of this committee is to sell the idea to the pupils in their respective rooms and eventually sign up every boy and girl for one or more hobbies. This is a large order and will take many *sales talks* and an occasional change in membership.

It might be helpful at this point to list the diversified hobbies entered in our last exhibit:

1. Airplanes
2. Sculpturing
3. Sketching
4. Coins
5. Scrapbooks
6. Photography
7. Puppets
8. Boats
9. Guns
10. Furniture
11. Samplers
12. Needlework
13. Wood carving
14. Wood burning
15. Model boats
16. Dennison craft
17. Miniature racers
18. Radio
19. Rugs
20. Quilts
21. Beadwork
22. Miniature trains
23. Pencil drawings
24. Knitting
25. Soap carving
26. Braiding and knotting
27. Chemistry
28. Scout handicraft
29. Weaving
30. Metalwork
31. Badges
32. Flowers
33. Charcoal sketching
34. Painting (oil and water)
35. Leathercraft
36. Models
37. Doll's clothing
38. Woodwork
39. Pigeons
40. Fishing equipment
41. Moving pictures
42. Posters
43. Recipe book
44. Inlaid pictures
45. Whittling
46. Painted plates

Collections

1. Dolls
2. Stamps
3. Coins
4. Flags and pennants
5. China animals
6. Poems
7. Movie stars
8. Books
9. Keys
10. Baseball pictures
11. Autographs
12. Match covers
13. Pennies
14. Dog ribbons
15. Soldiers
16. Post cards
17. Maps
18. Foreign dolls
19. Books
20. Pottery
21. Shells
22. Electric trains

Weekly meetings of the entire committee are held until the middle of January. Clubs of the more popular hobbies are organized under the supervision of interested teachers or local citizens. Persons in the community who have developed outstanding hobbies or commercial sponsors will gladly attend your meetings, demonstrate their handicraft, and assist in getting those interested started. The various clubs hold weekly meetings in the school building, primarily for the purpose of instruction and assisting each other. It must be kept firmly in mind that the hobbies must be carried on at home, during the pupils' leisure and in no way must it interfere with their regular school studies.

The posters were designed by the art students, and made in the print shop by the screen process

The school library is utilized in assisting the young hobbyists to get started. There are available several instructional pamphlets on the important handicrafts which can be secured at a popular price. One or two copies of some book on general hobbies will also be needed. If the first hobby show is successfully managed there will be adequate funds to provide a complete set of hobby books for the school library.

Planning the Hobby Exhibit

After the New Year holidays the first committee meeting is devoted to organizing a subcommittee whose function it will be to plan the hobby exhibit. This committee is appointed by the teachers in charge of this program. The members are selected from those pupils who have demonstrated their ability to secure the greatest number of hobbyists in their respective rooms. The size of this group will depend upon the number of pupils in the school building. With an enrollment of 700 pupils, a subcommittee comprising 12 members should be sufficient.

If some rooms are lagging behind at this point of the program, a large chart, placed in the main corridor, showing the percentage of boys and girls in each room who are riding their hobbies, will in a short time approach the 100 per cent mark. The secretary having charge of this chart should be held responsible for keeping the graph up to date.

A local sponsor for the hobby show will do much to put it over in a big way. This assistance is not difficult to secure as many of the local civic organizations will be glad to give their active support to such an exhibit. At the beginning of our second-year program the local Kiwanis Club volunteered to sponsor our hobby show.

The real work of planning the details of the exhibit will necessitate frequent meetings of the subcommittee. As the details and problems of the exhibit are discussed each member is given one or more definite assignments for which he is entirely responsible. If the right kind of a subcommittee has been selected, the teachers in charge will receive an agreeable surprise, new faith in the dependability of youth and, incidentally, fewer headaches. Give students a definite task, be sure they understand that the success or failure of the hobby show is in their hands, and the enthusiasm and success of the exhibit will be emazing. Perhaps it does have a similarity to the "kid circuses" we used to plan in aunt Abbie's attic or "Red Dillon's" cellar. If by inaugurating such a program as this we can bring some of that type of enthusiasm into our schools, the results from experience will warrant the effort.

The subcommittee should work out in detail all plans for the exhibit so that the two weeks' period before the actual opening may be devoted to the many problems which always arise. The important items to consider and arrange are listed and will be discussed in the order of their importance:

1. Exhibit space.
2. Date of exhibit.
3. Signs and posters.
4. Other school-building exhibits.
5. Adult organizations.
6. Scout organizations.
7. Citizen exhibitors.
8. Building room and club exhibits.
9. Method of exhibiting (tables, walls, etc.).
10. Space needed by each exhibitor.

Parochial schools also sent in their exhibits

11. Plan of space allotted to each exhibitor.
12. Publicity.
13. Tickets.
14. Judges.
15. Traffic squad and table attendants.
16. Orchestra.
17. Insurance.
18. Record of all exhibits entered.
19. Arrangement of exhibits.
20. Official opening.
21. Commercial exhibits.
22. Closing the exhibit.
23. Awards.

Exhibit Space. In choosing between the school auditorium and gymnasium give preference to the location with easy access and exit from a main floor, floor space clear of seats, wall space for hanging exhibits, artificial lighting and stage for setting off larger exhibits. If the exit can be arranged at the opposite end of the hall from the entrance, much confusion can be eliminated in handling the crowd.

When the location has been decided upon, measure the space accurately and make a plan to scale, showing available floor space, stage, and all window and door openings. This plan will be used later to allocate space to each exhibitor.

Date of Exhibit. As the exhibit is the termination of the hobby program it should be held as late as practical in the year, preferably just before the April school-vacation period. The actual dates should be timed not to conflict with other important local activities. The first exhibit attempted will probably have sufficient attendance to warrant a duration of three days and nights. Several very excellent reasons will be apparent why Wednesday, Thursday, and Friday should be selected. Our own shows open from 2 to 5 o'clock in the afternoon and from 7 to 9:30 o'clock during the evening.

Signs and Posters. All room, club, and organization signs should be of uniform size and lettering. The art teacher could hold a competitive contest and select the best design for use as a standard sign. Each individual exhibit must be labeled or tagged with the owner's name, building, and room number. The size of this card may be 1 by 2 in. The poster used to advertise the exhibit *must be different* from the ordinary run of posters appearing in the local store windows. Too much importance cannot be attached to the design of this poster. The poster used in our last hobby show was designed by the trade school decorating class and produced in quantities by the silk-screen process in the same class.

Exhibitors. By inviting the other schools in the city or town to take part in our exhibit we increased the interest in our hobby show, and stimulated a desire to find out more about our leisure-time activities. Invite the Boy Scouts, Sea Scouts, and Girl Scouts to furnish exhibits. Their display will provide a worth-while attraction.

There may be several local adult organizations or private citizens with outstanding hobbies which they would be glad to exhibit and which would be an added incentive to our young people. If so, invite them to take part. There will be no trouble experienced the second year in securing outside exhibitors.

An interested teacher should be asked to take charge of and plan an exhibit of teachers' hobbies. Each room and club in the building will be responsible through it's committee members for it's own exhibit.

Method of Exhibiting. If the various classifications of hobbies could be grouped together in the exhibit, the work of the judges would be much simplified. In the case of citizen exhibitors, clubs, scouts, and adult organizations, this grouping together in classifications can be accomplished. However, in the case of our own room and other school-building exhibits much grief and loss will be forestalled by keeping them

Keep the visitors far enough away so that exhibits are not handled

intact as units and directly under the watchful eye of one member of the room committee at all times. All units of the exhibit should have one member in attendance at all times.

Use wall space for hanging such articles as lend themselves to this type of display, and tables, arranged in aisles, to display smaller exhibits. It will be noticed in the illustrations that rows of seats appear around the tables. This arrangement serves a twofold purpose, i.e., that of providing a comfortable station for the exhibit custodian and a respectable distance between the observer and the object observed.

Space Required. The first year such an exhibit is attempted might save last-minute confusion to multiply by two the actual space each room or organization requests. There seems to be a universal tendency to underestimate the space needed to display a collection of dolls or a model airplane. As soon as the space needed by each room, building, or organization is known, it should be checked off on the scale plan of the hall.

Publicity. A life-size hobby horse built by one of the shop classes and painted by the trade school decorating group was our first line of publicity. The newspapers featured the hobby horse in their preshow write-ups. During the show hundreds of the younger children clamored for a ride on the horse.

It is on the item of publicity that the sponsors may be of the greatest assistance. They will probably be glad to accept such definite responsibilities as newspaper publicity, printing of tickets and awards, distribution of posters, securing tables, and furnishing decorations.

By decorating a local store window as shown in one of the illustrations, one week in advance of the show, excellent publicity will be secured.

Tickets. The tickets can be produced in the school print shop. One person should be responsible for the sale of all tickets. Pupils of the building presenting the hobby show may be given a free ticket. The price at which all tickets are sold to other schools and the public will depend upon local conditions. At ten or fifteen cents, enough tickets will be sold to pay all expenses of the exhibit and provide an adequate school fund for carrying out the succeeding year's hobby program.

It will probably be found that the pupils will dispose 80 per cent of the tickets sold.

Judges. The judges should be invited to serve and may be composed of either three or five members. Representatives of the School Committee, Kiwanis or Rotary Clubs, Parent Teachers Club, and City Government should be considered. For the purpose of judging it is essential that the committee and judges agree on a classification of exhibits.

Traffic Squad and Table Attendants. A dependable and well-organized traffic squad will decidedly assist in maintaining order and eliminating loss and breakage. This group may be selected from the school traffic squad or be composed of Boy Scouts and Girl Scouts.

The table attendants must necessarily be the room committee members and someone duly appointed by the other buildings or clubs exhibiting. Each should be at his or her station ten minutes before the opening hour. The efficiency of these two organizations can make an embarrassing dilemma or a pleasurable task to those in charge during the operation of the exhibit.

Orchestra. If space can be made available, the school orchestra will furnish additional interest to the exhibit.

Insurance. Fire and theft insurance, although not necessary, will relieve those in charge of much concern. The rates for this type of insurance are not exorbitant and if police protection is provided will average about $10 for each $2,000 of valuation.

Record of Exhibits. If the space is all in complete readiness the day before the opening, there should be no trouble experienced in accepting and arranging all exhibits during the morning prior to the official opening. The room, club, and organization representatives should be the only persons allowed in the hall. If all committee members connected with the exhibit are given a ribbon badge, this function can be easily controlled.

The committee president or manager should have charge, under the supervision of some teacher, for the proper arrangement of all exhibits.

The committee secretary with a carefully selected staff should be stationed at the entrance to accept and record each exhibit and assign them to the space allotted. This record can conveniently be made on 3 by 5-in. cards and indexed. This operation can be further simplified by asking each room, building, or club to furnish a list of all names and articles entered.

Official Opening. The publicity derived from a dramatic opening need not be dwelt upon. Our most successful opening was staged last year. The date was scheduled to coincide with the regular meeting day of the sponsoring Kiwanis Club. A luncheon was served in the school lunchroom. The president of the club rode into the room on our life-size hobby horse from which he officially opened the hobby show. After the irregular business meeting which ensued, the pupil committee escorted the members to the exhibit hall. Invited guests to this opening should include representatives of the leading newspapers.

Commercial Exhibits. This type of display has been ruled out in our exhibits. Undoubtedly some of these exhibits would be of value, but when this type of display is once started, the whole foundation of the program and the interest in the exhibit will suffer.

Closing the Exhibit. The return of exhibits to the owners should be closely supervised. Here again to avoid confusion, only room, building, club, and organization representatives should be allowed to dismantle the exhibit. As each exhibitor leaves the hall a signed form must be delivered to the secretary, stating that all articles of each individual exhibit have been reclaimed in good condition by the owner or representative. A check against all outgoing exhibits should, of course, be made with the secretary's card-index system.

Awards. The awards must necessarily be made on a basis of two general groups, i.e., citizens and pupils. These two groups should be further subdivided into classifications, such as — *art, stamp collecting, models, scrapbooks,* etc.

The award certificates may be formally presented at a general assembly.

Industrialism and Adult Education*

BURL NEFF OSBURN

State Teachers College,
Millersville, Pennsylvania

One of the phrases coming to be associated with industrial arts and with this association is the oft-expressed thought that we are "learning to live in an industrial democracy." Lest we accept this as a slogan for adult education without critical analysis, we should examine what is involved therein and try to discover some of the implications for this area of education.

The environment of modern man is to an astonishing and increasing degree made up of machines and the products of machines. This rapidly shifting environment presses upon us all, and there is no escape. We find ourselves relieved of burdensome and profitless toil, and at the same time weighted with the load of debt and social misery brought on, at least in part, by this same instrument for multiplying energy. The classic statement of John Stuart Mill that the machine has never saved man any labor remains without successful contradiction.

We live in an age of potential social well-being, yet we permit the power of the machine to culminate in political dictators, and the imminent danger of the destruction of much that we hold to be good. The democracy envisioned by Jefferson for an agrarian-handcraft society already has been altered radically, and its very existence has been challenged by the irresistible power of an urban-machine *blitzkrieg*.

Let me hasten to disclaim any opposition to the ideal of progress, or to the improvement of the standards of living which the machine has helped us to secure. There is no desire for a return to the "good old days", or to sponsor a "back-to-the-hand" movement implied in the criticism. Rather is there a recognition of the need to face realistically the problems brought by industrialism and to attempt to open the way for the use of intelligence in their solution as concerns adult education.

I will leave to others an enumeration and a description of the benefits of the machine. Its devotees and apologists are many, and they are well armed with statistics. I will choose, rather, to point out some of the conditions associated with the term "industrial" which seem to be inherent in the system and which call for some kind of remedy. Some of these seem to be inconsistent with a philosophy of democracy, and therefore require that choices be made.

With the coming of the industrial revolution the home and the small shop of the craftsman gave way to the factory as the unit of production. This has since led to large-scale concentrations (granting a small counter movement) and the passage of the ownership of the tools of production from the craftsman to the corporation. The disadvantages to labor in this shift are too obvious to require pointing out, but for the moment we might note that with this change has gone the personal interest of the employer friend in his employee associate, and the substitution of the relation of absentee stockholder to a tool of potential profit.

By its very nature the machine tends to become automatic, particularly at the point where an adequate wage, with its possibility of a relatively high standard of living, threatens to wipe out or seriously reduce the profits from skilled work. This statement still leaves room for the many kinds of work which, up to now, have not been mechanized. This automatization is a process of eliminating the need for and the use of intelligence on the part of the worker and of transferring these to the machine, which follows unalteringly the directions of its designer and owner. There are advantages in this transfer for the consumer, but some distinct disadvantages for the worker. It must be recognized, at the same time, that the substitution of an automatic machine in the place of a worker whose job has become specialized to a high degree may be a humanitarian move. This will be true provided one assumes the desirability of mass production, and provision can be made for the displaced worker. The latter problem seem insurmountable, with our present *laissez faire* attitude.

An increasing ratio of production to population, together with style and technical changes, have temporarily or permanently eliminated a large percentage of our population from employment. Economists by no means agree that the machine is to blame for unemployment, but there is strong and increasing evidence pointing in that direction.

The use of the machine contributes to and depends upon a highly integrated society whose delicate adjustments are easily thrown out of balance, with disastrous results reaching far into the socioeconomic body.

Standards of judgments of life values have changed to those of the machine. The quantitative goals of "bigger and more" have supplanted all too frequently the qualitative goals "fine and enduring."

The old values of self-dependence in economic life, and even in recreational areas of living, have given way to dependence upon the machine and its uncertain and unsatisfying returns. Developments have proceeded on the apparent assumption that man desires to escape effort, until he has come to believe this to be for his welfare.

The rise of the machine has been accompanied by an alarming increase in mental instability, for whatsoever cause, with greater numbers of persons being confined to institutions. Much of this condition is laid to the strains of modern living, for which the human organism apparently is not designed.

Much of the foregoing is seen to be in opposition to the nature of the individual as we understand him. Man is basically a unique and highly integrated organism, able to acquire many types of skills and to use them with intelligence. He seeks justification for his efforts, continually refines the goals of living, and highly prizes successful accomplishment. Balance and self-respect must be maintained, and if not available in one area of living are sought in another. Work, which should be an absorbing and creative activity consistent with organic well-being and psychological satisfaction, all too often is destructive and degrading, driving the individual to some form of counteractivity to bring the needed personal values.

The society which we believe provides opportunity for the optimum development of the individual — the democratic society — holds as its basic belief a respect for individual personality. It encourages the use of intelligence; it seeks the opportunity for creative living through a stimulating and wholesome environment; it would make qualitative living the norm. Effective self-expression and the use of intelligence in work and play become potent means of attaining and sustaining a desirable personality.

It is all too evident that the ideals of democracy are not attained by much of our scheme of production. When present perils are passed and some semblance of sanity is again achieved, it may be necessary to examine this industrial system with the view of saving what seems to be good, and of taking measures to repress its obvious evils. To accept anything less is to be fatalistic and inconsistent with the professed ability of man to act on the basis of his best judgment.

Meanwhile, what can the rapidly expanding adult-education movement do to take advantage of the good and to counteract, at least to some extent, the evils of the present system. It should be evident that the dangers of this system are the points of opportunity for adult education.

Vocational training opportunities are being offered in many public schools, YMCA, CCC camps, WPA, and other organizations for the adult who wishes to improve his occupational status. The range of choice and degree of completeness of these offerings are increasing yearly. No figures are available to show the number of persons so engaged, but every indication points to great numbers.

The harried adult of today is exposed to strains in his search for security that frequently overwhelm and leave him a mental or physical wreck. For these unfortunates there are many uses of the

*Paper read at the Milwaukee meeting of the American Industrial Arts Association.

arts in the techniques of restoration. Work especially selected for the correction of various disorders is utilized in surgical cases, tubercular patients, cardiac confinement, paralysis, accident victims, and orthopedic difficulties, as an accepted technique of functional restoration. Personality improvement is sought through absorbing occupations in the treatment of the depressed, and other types of psychoses. Private and public hospitals and sanitariums are now employing occupational therapists whose essential position as members of their staff is attested by the approval by the American Medical Association of a few selected schools for this special training.

There are those who, accepting the inevitableness of the industrial system of machine production, think it only necessary to counteract its destructive effects by leisure-time activities that are supposed to provide all of the good qualities lacking in work. It is held that in direct proportion as intelligence and skill are transferred to the machine, so will the opportunities for leisure increase to offset the unprofitable hours of thoughtless toil. Perhaps there is nothing that can actually compensate for hours wasted in uncreative activity, or the distaste felt by many in the form of work in which they are engaged. An intense interest, however, in a worth-while subject is a tonic for the human system. The pursuit of knowledge or skill challenges intelligence and performance with definitely wholesome effects on the entire organism.

As long as the system of machine production continues in its present trends, a large share of the population will be engaged in pay-roll jobs which, to say the least, fail to give the worker the needed stimulus. Many such persons now are finding renewed zest in life through the activities discovered in some home workshop, through equipment provided by the manufacturer of small power tools, or through attendance at one of the many shop or studio classes provided by the public schools, relief organizations, social settlements, and commercial agencies catering to this need. Reformatories and penal institutions are giving inmates the opportunity for a few forms of handwork for the very good reason that constructive attitudes and habits are readily formed thereby. Churches, missions, orphanages, transient camps, and shelter houses all turn to shopwork for much of their recreational program.

Economic security bids fair to become one of those nostalgic memories of a bygone age, as we are faced with ruthless forces that send us searching for some answer to the query, "How can one live sanely and with security in an industrial democracy?"

The unfortunate physically unfit who cannot compete in the market with the normal labor supply have been beyond the scope of the federal rehabilitation act, except in a few states. Nearly 100,000 persons each year are left incapacitated by disease or accident and unable to support themselves in the competitive market. For these there have been a few agencies organized to train in performing some work which is remunerative, and which, at the same time, provides therapeutic value, not the least of which is the result of feeling the satisfaction of earning even a small amount. The association for the blind has been particularly successful in doing this delicate and patient job. Hospitals for indigents, government hospitals for veterans, the league for the handicapped, homes for the senile, and the Lone Craftsman plan of the Minnesota Association for Crippled Children and Adults, are among those that give such aid.

Distressed population groups whose normal income has been lowered or cut off have, in many instances, found some form of homemade handwork a partial answer to the problem of making a living. Miners, for example, have been so aided by the Federal Government, by the American Friends Service Committee, and by the Catholic Church in setting up a new life for themselves on subsistence homesteads where a more integrated form of living promises to tide over present dangers and to establish a more stable economic life.

Farmers on marginal lands have been taught to add a small but necessary cash income to their meager farming through the manufacture of some form of salable goods. The mountaineers of the southern highlands, the rural population of New Hampshire, and to a lesser degree similar groups in the other New England states and in the southwest have benefited by this plan.

Historically the home was the productive unit, but the changes wrought by the industrial revolution have so completely altered our notion of that plan that to mention it as a possibility today is to bring a look of incredulity or unbelief to most faces. Neither are its possibilities at all understood even by those who should be informed. Nevertheless there is a distinct and strong trend in this country to induce large groups of unfortunates to abandon the long-held ideal of urban life and work in a store or factory, in favor of the subsistence home. It may be true that such a home fails to make possible many of the cherished amenities of urban living, but it does provide shelter, food, clothing, and a high degree of security.

There are many influences that make this a difficult program to carry out, and its success for any considerable number of persons is doubtful. For instance, there is the inertia of population drift to urban centers, which, although slowed down or stopped today, will doubtless operate at the moment when adverse rural economic pressure becomes acute, or factory employment rises. Education in the arts has not been readily available for any considerable portion of the population, or has existed upon the "marginal energies of the less-well-qualified workers in education." Also, there is an uncertain and often inadequate economic return for handwork which cannot compete with the costs of factory-made goods if these become competitive. Population instability is an adverse factor which makes it difficult to hold to one place long enough to establish the needed facilities for the productive home. Perhaps the most discouraging influence is the fact that our respect is traditionally for the machine and the urban life which accompanies it. Education is to blame to some extent in that it has followed other institutions in holding ideals of success antagonistic to the home as an economic unit.

There are a few favorable influences, however, in the work of such organizations as the Department of Agriculture, with its large staff of special agents, much of whose work is directed toward making the farm home productive of goods for household use and for sale. The actions of the state of New Hampshire has attracted wide attention and has inspired other states to attempt similar plans. Promising work is being done by the School of Living to discover actual costs of home production of goods by comparison with the costs of the factory product, with most interesting results favoring the home. Manufacturers of small power tools and the huge mail-order houses are entering the market with many types of household equipment, which indicates that these foresee some prospect for an extensive development of home production.

The school must come to see itself as a public agency serving all ages and all classes. Its academic tradition is breaking down under the pressure of reality, and the growing needs of greater numbers of our people for continued education not only of the usual make-up type, but in the techniques of reconstructed living. The teacher of industrial arts is possessed of the means for aid in many of the aspects of this growing program and will do well to study his community for ways in which he can contribute to it.

Advance machine design, drafting room, Macomber Vocational High School, Toledo, Ohio

Follow-up*

R. A. HINDERMAN

Director of Research and Special School Services, Denver Public Schools, Denver, Colorado

Placement and follow-up are significant activities in any complete guidance service. In addition they have dignity because they are charter members of the family. It is the purpose now to consider various phases of follow-up activities and some of the changes that have taken place in guidance objectives.

A quarter of a century ago educators and lay people talked a great deal of guiding boys into various occupations. Some persons even spoke of guidance as expert steering. And even today in the dictator countries those who rule choose for the people what they are to do, and steer them into occupations where they are needed and for which they seem to have some abilities.

Life in a self-governing free society is different. Indeed, each of us feels his worth as an individual, his responsibility to the group, and a challenge to use his intelligence and think for himself. The purposes of guidance services, therefore, are to aid an individual in gaining occupational information, in developing sensitivity to adjustment problems, in developing skill for making adjustments, and in having attitudes that prompt him to act. In other words, the aim of organized guidance services is to enable individuals to develop skill in self-guidance.

Follow-up to many persons seems to mean "running after," or "chasing down," or "catching up" with young men and women whom the guidance agent thinks need more guidance or for whom the school failed to provide adequate guidance. Just as telling, steering, or imposing the counselor's will on others cannot be regarded as guidance, so the running-after type of follow-up is not conducive of much good. True guidance seems to occur when a youth and a counselor work cooperatively on adjustment problems that the youth recognizes and wishes to solve, in a manner that engenders mutual confidence strong enough to prompt the youth to seek further aid from the counselor as new adjustment problems arise. The important consideration is that real follow-up is a cooperative activity, that the guidance services are available to youth who have left the school, and that the out-of-school youth have the desire for further counsel and the will to exert themselves to some degree in attempting to get the advice they need. The fact that many youths do not seek further advice when they have left the school is an indication of the lack of insight and teaching skill that counselors have developed in this relatively new educational field.

To make follow-up more effective, the whole guidance program from the elementary school through high school must be made more effective. Guidance services should become part of each child's school experiences, and the student should be led to regard guidance services as being of great importance, rather than as frills added to an already overcrowded school program. A most helpful guide to doing a successful job of vocational guidance in secondary schools is the "Interim Report" prepared by Dr. Lee and the superintendents who made the "Superintendents' Tour."

Methods Used for Doing Follow-Up Work

Various means have been used to follow up those who have left school with varying degrees of success:

Many schools hold open nights and develop a tradition that brings back their former students. On these occasions instructors, counselors, and placement officers discuss adjustment problems and the hopes for the future with these youth. Frequently these brief discussions lead to continued conferences, the formation of training plans, and the getting of new jobs. These contacts are worth while and help many youth and adults over rough places on the career highway.

Another means of follow-up is carried on by recreation centers, churches, young peoples organizations, the NYA, WPA, CCC, and other youth agencies who canvass the persons in their districts, blocks, or regions and invite them to meetings to discuss occupational adjustment problems. At these meetings there usually arise requests for more occupational information and for help in getting jobs. Information from local occupational surveys is very helpful and such general occupational information as that produced by the NYA of Illinois and other states is studied with much interest.

A third means of continuous guidance is used by some schools that have developed rather elaborate systems of follow-up by mail. These systems aid many youths to start again in quest of better things, and in general represent a real service, but it is only fair to say that a card or letter is a poor substitute for a personal interview. Nothing kindles the spark of human ambition like the living spark flashing from the heart and mind of a real counselor.

The services that have been mentioned are of great importance and should be used whenever possible. There are other problems with which youth must cope in the ever changing labor market. These changes are not only rapid, but they are difficult to understand and extensive in scope. The city-wide occupational adjustment service ministers to many of the needs just described. Expert specialized vocational guidance is to be had; preparatory, extension, and retraining vocational courses are available; and placements of all kinds are being made. The order in which youth use these services is unimportant because they are provided to meet the needs of youth in any order and at any time as the need for them arises. In fact youths are encouraged to depend on these services continuously, and to follow up the beginning made while they were in full-time school attendance. Strangely enough this articulated guidance service that stimulates self-guidance and cooperative follow-up brings to the attention of all concerned the general fact that there are many occupational-adjustment problems that still remain to be solved. If these problems are to be defined, and aid given to youths in their solution, then youths must be followed up, their difficulties must be analyzed, and subsequent curricular changes prescribed.

The research techniques that are needed call for careful leadership and a staff of interviewers. Here the assistance of the WPA, NYA, service clubs, and educational organizations of all kinds, are of untold value. Following is a brief description of the procedure followed in the investigation of the youth problem in Denver and twelve other cities in Colorado. In the twelve other cities the studies were conducted by the American Association of University Women.

Study of the Youth Problem

The report entitled "The Youth Problem in Denver" is based upon an adult education project of the Works Progress Administration. The Youth Survey Committee of the Adult Education Council of Denver consisted of representatives of the city schools, the Colorado State Employment Service, the National Youth Administration, and the Works Progress Administration. The Bureau of Business and Social Research of the University of Denver developed the plans for the survey. Frequent meetings of this committee were held to discuss problems of various kinds which arose during the course of the study.

Extensive use was made of the records in the office of the Department of Census and Attendance of the Denver Public Schools. These records consist of an active alphabetical card file of all persons 6 to 21 years of age who had a record of attendance in the Denver public or parochial schools. The study is based upon a sample of the city's youth obtained by taking all names from this card file of persons 16 years old or over on September 1, 1937, which appeared on the first 5 per cent of the cards of each letter of the alphabet. The data obtained from these cards for youth of the specified ages, whether in the public or parochial schools or not, included the following: name, address, date of birth,

*Paper read at the Grand Rapids meeting of the American Vocational Association.

sex, last school grade completed, the name of the guardian (whether father, mother, or someone else), delinquency history of the youth, and the dependency history of the family.

For the group no longer attending the public or parochial schools, additional information was obtained by personal interview. This information included place of residence at time of interview; activity status, distinguishing such groups as unemployed youth, youth employed part time, youth employed full time, housewives, youth in college, and a miscellaneous group consisting largely of those who were taking special training of one kind or another; and the conditions of family relationships at their places of residence — whether living with parents or relatives, boarding or rooming, marital status, or in college away from home. By use of the addresses of these youth, compilations were made by districts of the city.

The steps to be taken in making a study of the youth problem in a given community may be summarized briefly as follows:

1. Enlist the interest of a number of civic-minded individuals who will represent various groups within the community.

2. Secure a WPA project to make the survey. To file application for this project it is necessary to prepare a schedule of questions covering the items referred to above and an outline of tables to be used in presenting the findings. For the latter purpose the tables presented in the Denver report may be used as a guide. In addition, the WPA will provide other forms and instructions for filling them in. This probably will necessitate two or more meetings of the committee as a whole and perhaps the appointment of a subcommittee to work with representatives of the WPA.

3. Secure a supervisor for the project. The supervisor should be chosen on the basis of ability to direct the work of others and to do statistical work.

4. Secure information called for on the schedules both from school records and from personal interviews. To secure uniformity in the results obtained, the supervisor should make sure that there is a common understanding on the part of the interviewers regarding the information that is needed and the methods to be used in getting it.

5. Summarize the data in tabular form.

6. Prepare the charts and write the report.

Such an investigation reveals the extent of the youth problem, the location of the problem in the community, and some of the phases of the problem. Illustrative statements from the Denver Study[1] are:

"1. The number in this labor market group who did not have full-time employment and who were therefore making unsatisfactory use of their time, about 6,850, constituted almost 24 per cent of all youth 16 to 21 years of age in the city. Of the youth 16 to 24 years of age, the number unemployed or partially employed approximated 9,800.

"2. About one third of the unemployed and of the part-time employed did not go beyond the eighth grade, and about two thirds dropped out of school before graduating from senior high. Of the full-time employed, on the other hand, about three fifths were high school graduates. Because of the selectivity inherent in our educational system, it should be pointed out that the difference in the scholastic training of these groups does not necessarily account for the difference in employment status. In the development of an effective program for the guidance, training, and placement of out-of-school youth, however, consideration must be given to the educational background of the unemployed and of the part-time employed. In other words, such a program of occupational adjustment must prepare them for the kind of work which they are capable of doing. In the river-bottom areas, where the need is greatest, the bulk of the out-of-school youth have not advanced beyond the eighth or ninth grade.

"3. The high degree of concentration of the youth problem in certain areas of the city suggests the necessity for a program, geared to the attainments of the youth concerned, which will focus attention upon the needs of those areas. While the transient group in the areas in which the need is greatest is known to be comparatively large, the net change in the problem of a given area, caused by people moving in and out of it, is undoubtedly small. For this reason, a long-range program designed to meet the needs of the bulk of the youth in a given area would appear to be workable. Finally, information concerning the availability of jobs of the various kinds is needed as a basis for wise guidance."

These findings showed the need for an occupational adjustment service in Denver. However, there still remained a need for a knowledge of next steps to be taken.

Survey of Youth in the Labor Market

The survey of youth in the labor market was undertaken by the division of social research of the Works Progress Administration to determine by direct questioning of young people themselves, just what has happened to them from the time they left school to the date of interview.

Those interviewed were selected from youth who graduated from the eighth grade in public and diocesan schools in Denver in January and June of the years 1929, 1931, and 1933. A total of 5,845 boys and girls, representing nearly 50 per cent of those graduated, were selected for interview. The total number interviewed in all cities was approximately 25,000. In Denver the ages of the young men and young women at the time of interview ranged from 18 to 25 years.

The Survey was started in June, 1938, and has been carried on in Denver and six other cities[2] to give a good cross section of the United States as a whole.

In selecting the sample and in locating those to be interviewed a great deal depended upon the wholehearted cooperation, freely given, by the officials of the Denver public schools and the diocesan schools.

Abstract of the Denver Report

Recent studies, notably the *Youth Problem in Denver*,[3] have shown that there is a decided youth problem in Denver and that something should be done to help youth succeed in the labor market. Therefore, this study of the *Preparation of Denver Youth for the Labor Market* was undertaken during the summer of 1938 for the purpose of determining what the schools can do to help youth in solving this problem. The means were sought through an analysis of the difficulties and problems which youth already had encountered in the labor market.

The data presented in this study were obtained by means of personal interviews. Approximately 50 per cent of all of the eighth-grade graduates of both the public and parochial schools of the years 1929, 1931, and 1933 were thus questioned. The questions asked included: The amount of education received, reasons for leaving school, and a résumé of the labor market experiences from the time of leaving school and starting to seek work, until the interview for this study, covering a possible span of nine years (from 1929 to 1938).

A few of the outstanding findings and recommendations revealed from the study are:

1. Of the youth interviewed, 83 per cent had at some time been in the labor market. This large percentage would suggest the necessity for an educational program by which youth could be prepared for the labor market.

2. The average youth in Denver graduated from high school, entered the labor market at 18 years of age, worked 46 hours per week, received $16.59 as weekly earnings, and was unemployed for 6.3 months per year.

3. The youth problem in Denver is most acute in the districts along the Platte River. Almost half of the youth in these districts fail to complete high school; therefore, the time to help as many of them as possible is in grade school and junior high school.

4. Little relationship seems to exist between the education youth received and the progress they made in the labor market, as measured by their weekly earnings.[4] A youth with only an eighth-

[1] *The Youth Problem in Denver.* The Youth Survey Committee of the Adult Education Council of Denver, July, 1938.

[2] The other cities are: Binghamton, N. Y.; Birmingham, Ala.; Duluth, Minn.; St. Louis, Mo.; San Francisco, Calif., and Seattle, Wash.

[3] Report of the Youth Survey Committee of the Adult Education Council of Denver, 1938.

[4] This statement is not meant to apply to college graduates. The number of college graduates in this study was too small to allow any conclusions to be made regarding them.

grade education is just as likely to succeed as a youth with a high-school training.

5. Since many youths leave school because they are unable to keep socially abreast of the other pupils in school, the teachers and the pupils should act together in a united effort to eliminate this stress on financial standing.

6. The schools should offer occupational guidance and training for the semiskilled occupations, since the vast majority of both youths and adults is employed in jobs requiring work of a semiskilled nature. This training should include preparation and domestic work.

7. The present business-training program should be evaluated in order to investigate possible needed changes in the way the commercial courses are now being taught and the advisability of offering a few of these courses in the junior-high-school curriculum.

8. The two means which youth found to be most successful in securing jobs are personal application and friends. Therefore, the youths still in school should be taught the most effective way of applying personally for a job, and should be encouraged to make many real friends who may be helpful when occasion permits.

9. Two thirds of the youths in the study said that they had no difficulty in landing jobs if they could only find job openings. This is a definite challenge to the occupational adjustment service to locate the job openings as they occur, and to acquaint the out-of-school youth with them.

These findings have made detailed curriculum changes possible. And while these studies required diligent work, the results seem to be very gratifying because light has been thrown on what should be done to aid youth in becoming skilled in cooperative follow-up.

The Vitalized Industrial-Arts Curriculum

OTTO A. HANKAMMER

Kansas State Teachers College, Pittsburg, Kansas

With all of its machinery, education has but one focal point, the learner. The learner has his existence in needs, biological, social, and economic in nature. A vitalized industrial-arts curriculum can contribute heavily in meeting the responsibilities of general education. It cannot be otherwise when every activity of life is directly influenced, and often controlled, by the results of our technological advancements. The establishment of an industry-machine culture pattern is a fact, not a fancy. Added to the impact of technology upon human living are changes in psychological theory and the newer concepts concerning the school as a responsible force in a democracy. General education then must provide adolescent youth with experiences rich and significant for him. These experiences must promote the potentialities of the individual to their maximum in a way compatible with democratic living.

Analyzing the Adolescent

In observing the adolescent, we find his behavior conditioned by the psychological and physiological changes he is undergoing. He develops an amazing amount of curiosity. He wants to get acquainted with the world and find his place in it. He wants to investigate and manipulate materials. He displays a variety of interests, abilities, and appreciations, all of which attest to his growing powers and desire for achievement. In short, the adolescent period indicates numerous peculiar needs in relation to many situations.

Recognizing the inextricable and continuous interaction between self and environment, to give point to this discussion, let us set forth certain categories of needs of the adolescent individual. We may arbitrarily sum them up under the following four heads: (1) purely personal needs as a central core; (2) the next circle, social relationship needs; (3) the more remote circle of influence, civic relationship needs; and (4) cutting across all, economic relationship needs.

Having observed something of the nature of the adolescent, how may industrial arts contribute to meeting purely personal needs of the individual? First, by recognizing and satisfying certain biological urges as the urge to muscular reaction; the urge for varied experiences; and the urge for activities having a significant purpose for the individual.

By its very nature industrial arts is fundamentally an activity program. The physical activity necessary to solve certain problems in the industrial-arts laboratory is in marked contrast to the physical inactivity found in the traditional classroom. This physical activity in no wise implies an inferior type of thinking. In fact, because of their objectivity, the results of activity give us more positive evidence concerning the quality of thinking than do many of the results of the more abstract studies as now conducted.

The urge for varied experiences rests upon the innate tendency to explore, to investigate. To prevent adequate growth in this direction is almost certain to bring about maladjustments, if we are to accept the word of psychologists and psychiatrists. The implication here is that the industrial-arts curriculum be rich in experiences and meaningful to living. Furthermore, the industrial-arts curriculum which provides activities having a significant purpose for the individual gives constant opportunities for creative expression. By creativeness we refer to the ability to make unique adjustments to new situations. The adolescent is a creator, possibly not always of things tangible to the hand, but certainly always a creator of values. To develop genuine creative effort, often of course, will bring the child into conflict with the doctrine of conformity. Education, to a large degree, has been concerned with the process of training to meet old standards and conventions, not only ethical, but also intellectual and physical norms as well. Obviously, civilization has its foundations deeply rooted in experiences now crystalized but that fact is no proof that blind acceptance is the only desirable way. Youth must not only carry on civilization but must also carry it forward; hence the demand that we invite and respect creative expression.

The vitalized industrial-arts curriculum provides varied experiences through activities which give a world picture and which include many elements making for a personal philosophy of life. It insists that solutions of problems and projects give evidence of the creative mind at work. Through self-direction, choices, and consequences, behavior is molded. Self-assurance and a sense of achievement, so necessary to all, are increased through problems and projects which can be measured objectively, handled, and admired. An emotional tone pervades all behavior. If our industrial-arts curriculum is applicable to personal living, there will be no hypocritical response, rather satisfactions and appreciations of the outcome of creative effort will be apparent. Attitudes and a sense of values valuable to any normal individual will have been matured.

In meeting personal needs, industrial arts is concerned with helping the individual orient himself with reference to personality problems. He should be aided to obtain knowledges, skills, habits, attitudes, and understandings essential to the attainment of his goals. He needs to develop a sense of interdependence of knowledge. He should be appreciative of the origins of civilizations as reflected in their material cultures to the end that he may better understand contemporary society.

The Adolescent and His Relationships

Closely knit to the personal needs of the adolescent are the needs arising through certain relationships. Particularly important are his relationships to his family and the upkeep of the home. It is quite possible that industrial arts may contribute something which aids the adolescent to participate constructively and progressively

in home and family life. To the extent that industrial arts can give a better world picture and more nearly give the adolescent an understanding of industrial changes which affect the home environment, the more likely will certain frictions between adolescent and the rest of the family be lessened or removed.

Technological change has altered family life completely. Power machinery has taken industry from the home into the factory. Even the amusements have been commercialized. No one knows to what extent the auto alone has revolutionized the social order. Modern architecture, furniture, home accessories, and communication have further transformed modern living. This change has thrown new responsibilities upon our educational structure. It would seem that industrial arts is imperative, if for no other reason than to provide the adolescent with a special extension of an enlarged environment in which to train himself to adjust to a machine-industry society in which he will have to function. The shop and laboratory environment provides opportunity to work with other persons. It requires an adjustment to a type of authority, not an arbitrary one, but an authority inherent in the situation; for example, the necessity to respect machines and tools if he is to escape injury. The adolescent would experience the authority of natural laws and principles. No project, for instance, will be fully satisfying if he fails to observe and respond to aesthetic principles. There is even a type of social authority which he cannot escape for all adolescents will share and evaluate certain experiences.

The industrial-arts laboratory provides an ideal situation for leadership and followership. It gives a definite responsibility and creates the feeling of *growing up*. Of course, suggestions for work and leisure-time activities in the home inhere in any industrial-arts curriculum worthy of consideration. The jobs are concrete experiences and of worth to the home, while the learning involved is specific and confidence building. Industrial arts in these close social relationships should mature a sense of responsibility and a better understanding of relationships between the home and an industrial society.

Our third category of needs lies in a more remote circle of influence. It deals with civic relationships. As far as the social aspects of this category are concerned, they are quite closely related to the thought expressed on social relationships. Civic needs, for the sake of this analysis, reach beyond the confines of the home and family life into social and civic institutions, local and national governmental activities and agencies. It brings the adolescent into closer contact with the social heritage which has given us our customs, traditions, and our ideals of democracy. It brings the adolescent face to face with the larger problems of society.

One of the elements which makes this category difficult to handle is the fact that our institutions are changing their structure and function as, for example, the institution of the home. We have seen that virtually all semblance of manufacturing has passed out of the home into organized industry with the attendant shift of certain responsibilities. We are not seeking a return to the old state, we would not if we could. The point to be noted is that education has not fully met such marked changes. Educationally, we still think in terms of traditional subjects rather than in terms of individual development in a democratic society. The adolescent must experience problems through actual participation in activities involving reflective thinking if he is to be disposed to place a high value upon abilities, industry, invention, and resourcefulness of peoples of other times and of other races and cultures.

Society in a Technological Age

The industrial-arts curriculum, when presented with all of its implications, will not only give technical skills on the machine and in the drafting room but it must throw light on social problems rising out of the machine process and industrialization of society. Such industrial problems as housing, problems of transportation, recreation, and human relations come under the purview of industrial arts. Industrial arts, through its problems and projects, can make *community planning* more than a newspaper phrase. Such terms as *division of labor, mass production, repetitive processes,* and the like, take on a new significance when associated with experiences actually involving the principle underlying these industrial concepts. The topic, standards of living in relation to increased productivity, can be made more than an abstraction. Specialization and its effect on rates of pay can be given some reality through experiences which are a legitimate part of the industrial-arts curriculum. The adolescent can be given some comprehension of the interrelationships existing between transportation, communication, and materials of commerce. From such knowledge we can lay further foundations for a degree of understanding with regard to recent developments in governmental control. A democracy is dependent upon an intelligent citizenship, and as industrial-arts teachers it is a part of our duty to help make intelligent citizens as well as skilled ones. Industrial arts then, in this broader field of civic relationships, is concerned with helping the individual understand the interaction between industry and our social institutions.

One cannot speak of social life without facing certain economic implications. This close relationship has been implied throughout the discussion. Social change has delayed the adolescent's entrance into economic activity. It has brought him responsibilities as a consumer of goods. He is faced with decisions regarding associational activities. More and more will he see the hand of government in the solution of economic problems. It is imperative that the school assist adolescent youth in formulating intelligent judgment concerning these and other problems of economic life.

Scientific and technological advances have transformed the older order and conditions. The demand for youth's labor has almost disappeared. Apprenticeship or opportunities for participation in economic operations have been reduced to a point where the adolescent has extreme difficulty in finding anything which will lead to vocational competence and economic independence. Such conditions produce unhealthy mental states in youth. To mention this condition is to indicate an additional responsibility for the school. And with industry raising age limits, the problem is going to demand something distinctly more than the work of our traditional schools, as good as they are.

With increased leisure time, more commercialized amusements, and often an available automobile, the adolescent needs particular help in the development of intelligence with regard to use and care of these things which, uncontrolled, become a social menace.

Industrial arts is particularly well fitted to give the adolescent experiences which parallel the serious economic activities at which men earn a livelihood. While such experiences do not anticipate specific vocational ends, they do give an emotional assurance of economic achievement and a degree of vocational orientation.

With the passing of the direct relationship between producer and consumer, and the vastly increased variety of goods to be had, education of the consumer or *consumer literacy* as it has been termed, is becoming much more important than in bygone generations. The attitude of being critical — not cynical — needs to be developed as a fixed habit in the adolescent. The vitalized industrial-arts curriculum provides abundant knowledge concerning desirable and undesirable qualities of mechanical and industrial products. Standards, grading, specifications, and the like become a part of the instructional tools for the adolescent in solving an industrial-arts problem. To know and to use such data intelligently should make him sensitive to the social-economic significance of consumer problems and their relation to legislative action.

That we live in a machine age is soon apparent to those participating in industrial-arts activities. The laws of physics and engineering principles are illuminated in a new and interesting manner. To understand a machine through dissection and reassembly, to trace the flow of energy with all of its transformations, to study the properties of each part in relation to function is to give the adolescent a point of view and a mental slant which cannot but culminate in a degree of appreciation for design, accuracy, and the importance of experimentation and planning.

Beyond a doubt, machine technology has helped to bring about present economic and social conditions. The adolescent needs to be made aware that this technology has increased division of labor, made mass production possible, raised the standard of living. It also has brought us technological unemployment, standardized products, industrial hazards. It has increased the quantities of goods and lowered prices on the one hand and destroyed skill and the ideals of individual craftsmanship on the other. The adolescent further needs to know that *modern industry is carried on by means of mass activity, specialization of function, and a high degree of integration.* The worker is very dependent upon a machine or organization. To the extent that the whole social and economic system functions, he works and lives. Hence, the necessity of curriculums which build attitudes of cooperativeness and give understandings of economic controls.

A Guiding Philosophy

Having noted some of the needs of the individual as they relate to purely personal living, social relationships, civic relationships, and economic relationships, just what can be done or should be done to vitalize the industrial-arts curriculum to meet these needs more adequately? It would seem that the first thing is to have or formulate a point of view or a philosophy. Without a guiding philosophy, education is much like a ship without a rudder. The first assumption underlying our philosophy is that the program be constructed upon a democratic basis. It must involve the constant reconstruction of beliefs and attitudes in which there is a proper recognition of individual differences and the principle of community living. We need to aid the adolescent to achieve his ideals and goals through an emerging philosophy of his own. He must have opportunity for the exercise of enlightened and independent judgment. This can be done, not by indoctrination, but by providing problems and projects of personal and social significance; by raising searching questions which bring to light relationships which the adolescent is unlikely to discover for himself. He should be taught the steps of logical thinking, how to get and use facts, in short, the scientific method.

Another assumption in our philosophy for industrial arts holds that there is no *higher* or *lower* order of subjects in the curriculum. There is nothing *per se* in any subject which makes it uniquely valuable as an intellectual ornament. It is only as the subject becomes a functioning tool that it becomes valuable, and then only to those using the tool. If this assumption be accepted, then those tools most useful to the greatest number are the most valuable subjects for the school situation. Tools that were valuable in bygone ages would be stored with the rest of the relics while modern tools would be put into immediate service. Unless the public schools of America appreciate this principle, it seems a certainty that they will be faced with the development of a dual, if not a counter system of education claiming to meet these demands.

Considering industrial arts as a part of general education, our methods must recognize the aims of general education and the nature of the adolescent. Undue emphasis upon just one element of the curriculum, skill, is a besetting sin. The experience should be emotionally satisfying — balanced. Let excellence of products and projects be a concomitant of growth and development of the learner, as he advances in the course.

One scarcely need mention that the industrial-arts curriculm purporting to give industrial insight naturally employs methods of instruction which are industrially correct. Practice in drafting, as an illustration, should follow the industrial criterion, and this in no wise vitiates the exercise of independent judgment. Likewise, the principle of economic soundness should be recognized. To do otherwise is waste. Certainly the words waste and inefficiency should never be applicable to any industrial-arts program.

In the vitalized industrial-arts curriculum, what shall be the content? Naturally, those activities which meet the basic needs of the individual. Obviously, the adolescent may not always recognize the worth of certain activities. However, we who guide in curriculum development should recognize, evaluate, and accept only that which meets the criteria to be derived from the foregoing discussion. One criterion particularly to be held in mind is not the mere summarization of a body of knowledge in formulating a curriculum but the degree to which this knowledge functions in the life of the adolescent as revealed through his choices, actions, and attitudes.

Suggestive Industrial-Arts Experiences

To indicate but a few of the possible suggestions for industrial-arts experiences, the following is offered:

Experiences Bearing on Personal Living

Production: All kinds of constructional projects of personal and mass-production nature.

Visitation: Group and individual visits to industrial plants, studios, offices, shops.

Aesthetic: Drawing, crafts, photography, stage, displays.

Literary: Digests, reviews, reports, biographies, monographs.

Demonstration: Class and other school groups, parent and civic organizations.

Organization: Clubs, committees, assistantships.

Experiences Bearing on Social Relationships

Practical competence: Home mechanics and repair.

Leisure: Craft and hobby interests.

Experiences Bearing on Civic Relationships

Cultural: Origins, cultures, arts, history.

Government: Housing, city planning, labor relations.

Investigation: Materials, processes, industrialization.

Conversation: Safety and accident prevention, waste utilization, noise abatement, air contamination, conservation of resources.

Cooperative enterprises: Production by groups for social service, school repairs, preparation of teaching materials; personnel activities.

Experiences Bearing on Economic Relationships

Guidance: Study of vocations, analysis of success factors.

Consumer literacy: Advertising, costs, reports, analyses.

Testing: Interpreting natural phenomena.

Experimenting: Constructional projects, repeating industrial processes, investigations and simple researches.

Such a list indicates almost unlimited possibilities for experiences varying from simple routine to the most complex creative acts. It provides not lifelike experiences but life experiences. The plea is to vitalize and enrich the industrial-arts curriculum. Add significant industrial representations. Try methods even though they break traditions. Seek problems which have current complexion as well as those having historic precedent. Use materials so new that the teacher must learn the qualities hand in hand with the pupil along with materials having a noble tradition.

Finally, and this is a splendid avenue for the enrichment of the industrial-arts curriculum, relate the work to other areas. We must see more clearly our distinct relation to the social scene. It is with regard to the social-economic aspects of living that industrial arts can contribute most. Skills, knowledges, and understandings can be developed which have vocational and economic worth. Through the media of industrial arts an intimate relationship can be established with science, geography, history, art, and the material cultures of the past. To adequately describe, plan, and specify industrial-arts problems and projects; the tools of expression, language and mathematics, are made to function naturally rather than in formal and academic fashion. Industrial arts can provide the adolescent with a curriculum based upon the psychologically sound principle of learning through controlled activity, relatively free from abstract symbolism, and withal intimately associated with the industrial-culture pattern in which he will be a unit. May we who are responsible for the development of a vitalized industrial-arts curriculum cast our eyes forward rather than backward, use our *microscopes* less and our *field glasses* more.

Born in the Brain

DEAN M. SCHWEICKHARD

Assistant Superintendent of Schools, Minneapolis, Minnesota

Perplexing Differences

The queries in the course of human experience which contribute most to the stimulation of further thought and study are the ones to which the answer or solution is not readily discernible. The child who has his every question answered immediately and completely by the parent, nurse, or teacher soon finds his interest waning and his inquiries flitting here and there over unrelated fields. The one who helps to unravel his own problems lays a firmer ground for his path ahead.

In the realm of adult observation, one often ponders over the question of why one school should have an industrial-arts department while another similarly situated may have none at all. Or why should the school which once had such a department have one no longer? How can the difference be accounted for between the flourishing course or department with a waiting list seeking admittance, and the one limping along on its last legs?

Not only in school circles, but in industry, business, and public life there are conspicuous differences. On the one hand, there is the individual who delivers the goods to the satisfaction of those whom he serves, and on the other there is the one who simply holds a position or a job. Opinion is not always unanimous as to just where the line of distinction may be drawn between the two, but in the long run the sediment settles and the water clears.

But still the difference is not accounted for on any basis of external demonstration. The explanation lies within that part of the human system still very imperfectly understood except by the evidences of its activity. If the visible results are different the only conclusion which can be drawn is that there are appreciable differences between the fertility of the mental powers which produced these results.

There were differences between Christopher Columbus and the men of his day. His voyage across the Atlantic Ocean was first born in his brain. No one else had made such a trip, no one had thought seriously enough about it to try it. No facts had been established, but he proceeded on a belief so strong it might just as well have been a fact, and indeed it turned out to be. And so today we observe Columbus Day in honor of the man who had what it takes to be constructively different.

The Creative Urge

One classification of people would divide them into two great groups, the optimists, and the pessimists. Many attempts have been made to define each, but perhaps the most widespread impression might be summed up by saying that the optimist is satisfied with things as they are, and the pessimist is not. It might be much more nearly appropriate to think of the comparison in a little different light, which would reveal the pessimist as the one who sees many flaws in the status quo, but believes any attempt to remedy them is futile. By way of contrast the optimist may still see just as many imperfections, but goes about intelligently seeking ways of improvement.

All of the industrial arts which men have practiced or are now carrying on, have come into being because someone was not satisfied with natural resources as he found them, or he could not use them in their natural form. His brain delved into the question of mechanical processes and devices which might be utilized in bringing about the desired changes; into chemical actions and reactions which might be employed; into the command of power much greater than his own to accomplish results of which he was incapable; and even into the possibility of creating new materials and resources not hitherto found in any natural state.

Other vocations than those having to do with the industrial arts are still based upon a desire to make a state of affairs or a material thing different than it is. The work done by everyone is divided roughly into two great classifications — mental and physical, but one is never independent of the other. Up to a generation ago there was a sharp conflict between academic and manual phases of school work, as though one were the antithesis of the other. Gradually, however, there has come a clear understanding that any worth-while work in either field must be preceded by and accompanied with appropriate functioning of the brain.

In school shops there is the constant question of whether to use a plan or design already made, or to create one which is more or less original. The more common practice is probably to use the ready-made design, but the results are not as completely satisfactory as to create one. Why should this be so? Part of the answer lies in the fact that the design created for the occasion takes account of the little details that make the difference. Further than that it gives the creator of the design a certain kind of satisfaction not attainable in any other way.

The Germ of Education

Even a speech prepared and delivered to fit the occasion carries with it more vigorous spirit on the part of the speaker and stimulates keener interest among the listeners than the one taken from stock. The same principle carries through education in that it must be made to fit the individual. This does not mean that each child shall have a separate teacher of his own, but rather that the skillful teacher shall early lead each child into learning how to be a creator of education that will fit himself out of the resources available to the entire group.

Education that is worth the name is much more than the complex collection of facts and formulas sometimes paraded as such, and still withal more simple. In its larger sense it consists in sifting or sorting the things which arise in the mind, and cultivating those which have within them the possibilities for beneficial results. Knowledge and skill cannot be left out, but the acquisition of them should be kept in their true perspective and looked upon as serving the larger purposes.

Every normal individual has within him the desire to be free, the desire to accomplish, the desire to win the approbation of his fellow men, and other desires of greater or less intensity. The fulfillment of these desires brings satisfaction and the thwarting of them results in what is spoken of as frustration. Satisfaction usually leads to the birth of new desires leading to additional satisfaction of the same kind, or through those to greater and richer ones. Ideas attending these desires are usually constructive.

Frustration, on the other hand, is likely to lead first to intensified desire, but if continued leads either to despair or into new channels through which the old desire can be fulfilled. The ideas which create these new channels are more likely than not to be destructive.

From these two directions ideas come flocking into existence. They are like insects. Myriads come into being — some for good purposes, others for ill; many survive for short spaces, only to be lost in oblivion; of those that survive some contribute to the good of man, others pester him forever and even help to destroy him.

The mind of man becomes the breeding ground. If soundly endowed and carefully nurtured from within and without, it is like a vine which springs from good seed and is properly tended, it is more likely to be productive of a high percentage of good fruit.

These things hold true of nations as well as of the individuals of which they are made. They are moved by like desires, react in like manner if satisfied or frustrated, and reach their highest state of existence only when they learn to distinguish clearly between the forces which are creative and those which are destructive. In this balance lies the defense of the present and the hope of the future.

Efficiency is not in doing the unusual well, but in doing the usual unusually well. — *A. Mueller.*

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

REST—THY WORK IS DONE

The last issue of this magazine carried the news that George M. Brace, long-time director of vocational education and industrial-arts work at St. Paul, Minn., had retired in June, 1940.

The item carried a full account of how he prepared himself for his life's work and where he obtained the experiences which laid the foundation for the serious responsibilities in the educational field which he was to shoulder later.

His early education was strictly along academic lines, and his early teaching experience was in the sciences — he taught astronomy, chemistry, and physics — but when he entered the field of practical education as an instructor in mechanical drawing in St. Paul, he put such enthusiasm and energy into his work that he was chosen as the man who was to direct the industrial-arts work, and later also the vocational work in that city. How ably and well he did this is amply shown by the host of friends he had in school, out of school, and especially among his own teachers. He was an able leader who had the confidence and respect of all.

Then came the day of his retirement a few months ago. His friends wished him good luck and he and his good wife made plans for trips, which both he and she had hoped for so long. Unfortunately, however, while man can plan, the fruition of his ideas lie beyond his own powers. With plans unfinished then, George M. Brace, known to a large circle of our readers, was called to a better world. His work for the education of the youth of St. Paul had been developed to a point where others might well take it over. The servant had done his work well. The time for rest had arrived. George M. Brace, the true exemplification of what a real public-spirited citizen should be, had finished his work, and has gone to his eternal rest.

We who loved and respected him may feel that we have been deprived and robbed of the solace and pleasures of his companionship, yet we should be glad that he has now gone to a reward, such as is given to all wise and trustworthy stewards, in an existance of which we are still in ignorance.

THE OUTLOOK FOR YOUTH IS BRIGHTER

It is encouraging to read that a large corporation, such as the Chrysler Corporation, is ready to permit an employee to retain his present position with the firm and at the same time assume a position with the NYA that may have far-reaching results.

John Haien, director of youth training for the Chrysler Corporation, who was recently appointed by the National Youth Administration to direct the training of 100,000 young men for industry under the National Defense Program, now holds dual jobs, both of which have the same objective — to train youth for worth-while employment and useful citizenship.

John Haien has had a wonderful background of experience which fits him specially for youth guidance. Coming to this country from Holland in 1900, Mr. Haien, at the age of 15, went to work as a sweeper in a steel mill in Peoria, Ill. It took but a few years before he was made general foreman. After six years at this plant he decided to get more education. He went to Warrenton, Mo., where he studied and worked for two years. Then he studied at Boston University and later at Harvard.

In 1909 he became interested in youth work and wrote a series of pamphlets on youth training which were distributed widely in New England. From 1910 to 1914 he worked chiefly with boys in church activities and during the early years of the war taught signaling to young men. In 1915 he was made director of all youth activities in New Bedford, Mass.

Then in 1921, he organized and began the work which he has carried on and developed ever since. He spent his summers taking boys on six-week trips to different parts of the United States, visiting and studying business and industrial plants. During the winter months he lectured on educational and vocational subjects in schools and colleges.

It was this work which brought him to the attention of the officials of the Chrysler Corporation who engaged him in 1935, to develop similar work among the sons of Chrysler employees. At the present time Chrysler Corporation has more than 6,000 sons of its employees participating in this type of activity.

Mr. Haien's National Youth Administration program plans to form resident work training centers in rural sections throughout the country. At these centers young men between 17 and 21 will live together in groups of about 100. They will make certain specified articles such as hospital beds, tables, Red Cross equipment, radio transmission equipment, and other equipment required by public institutions. Each training period will last for six months.

Mr. Haien thinks that the best contribution we can make to the nation at this time is to train thousands of American youths to use their hands in the performance of a great variety of hand skills with hand tools. He hopes that by teaching them how to make things, by generating in them the instinct of workmanship and by encouraging them in the pursuit of excellence, they can be best fitted into industry and into our National Defense Program. He believes that a generation of versatile youths can be developed by exposing them to a wide range of vocational choices and by giving them occupational experiences with materials and tools.

In addition to these resident centers, "learn to work" groups in various industrial areas will be organized in which the young workers will receive six months courses in various shops.

Industry is beginning to see its duties and responsibilities in connection with the training of youth from whom must come the workers who are to replace those now active in all of the various areas of business and industry. The Chrysler Corporation is to be complimented on its willingness to partly resign the services of such an able man to the wider field of the NYA's National Defense Program.

This industrial influence in this gigantic educational venture can be of great importance. It is to be hoped, however, that the plans will be worked out in cooperation with already existing educational facilities. Too often new efforts are started out on independent bases, ignoring what has been done previously by other organizations. The schools have had hard work to convince taxpayers, businessmen, and industrialists that the kind of work now recognized to be so urgent, really was necessary. In spite of obstacles, school shops on all levels can point to notable successes. The NYA defense training program should not overlook the valuable aid the schools are ready to offer, and wherever possible avail themselves of the facilities already present thus avoiding the delay and waste produced by duplicating shops, equipment, and teaching personnel.

THOUGHTS AT THE OPENING OF THE SCHOOL YEAR

By the time this magazine gets into the hands of its readers most school-shop courses are in full swing. With the experience gained from previous school openings, and with the methodicalness and power of analysis engendered by the shop teacher's duties, it is to be assumed that most of the school shops, the tools and equipment, the materials and supplies, the illustrative and instructional teachers' aids, and the books and catalogs in the school-shop reference library, were all in first-class order on the first day of the school year 1940–41.

Most shop teachers too, on that opening day, had fairly well defined thoughts, or even written outlines of what they intended to accomplish in their course or courses during the coming year. Less often, however, does the planning done by teachers for the opening day of school specifically take the individual pupil into account who, after all, is the real purpose for which the school shop, the classroom, and the entire educational system exists. Too frequently the pupil is merely looked upon as the least important item in the entire school setup.

Just what position does the student hold in the teacher's estimation? Is he merely the fly in the ointment as far as the teacher's enjoyment of life goes, or is he the welcome opportunity whereby the instructor can satisfy a longing for worthwhile accomplishments.

It may be well for every teacher to ask himself, "Does my outline of instruction make provisions for the development of desireable habits and ideals in the student? Is his future as a member of a family, of a social group, of a community, of a country, considered? Is he taught that as a member of any group he acquires certain rights, but that with these rights go very specific duties and obligations which cannot be enjoyed without accepting the responsibilities that go with them?"

There are a few shop teachers who would hold that this phase of moral training is not a part of their duties. Others hold that it is inherent in their shopwork. It is folly, however, to expect that there will be any worth-while changes in the behavior patterns of the students, if no conscious efforts are made to produce them. Planning, not accident, must be relied on if the teacher of industrial arts and vocational education wants to affect the lives of his students beyond merely giving them skills and technical information.

OPEN HOUSE IN THE SCHOOL SHOP

Many schools make use of the open-house day or evening once or twice a year to show their communities just what is being offered to the students. These affairs are usually well attended and are excellent attention-getters for the school.

Naturally on these days the school shop gets a goodly share of the publicity because most of the visitors enjoy seeing the shops, and looking at the tools, equipment, and projects.

This open-house idea, however, can be extended, as far as the shop is concerned, so that the publicity can be kept active the year round. This can be done by having open-shop days three or four times per semester, or even monthly.

Of course, there are many shop teachers who pride themselves on the fact that their shops are open to visitors at all times. This is really as it should be, providing the principal does not object to this visiting.

The periodic open-shop idea is different from an opportunity to make a shop visit, however. The open-shop day is more formal. The stage, as it were, is set for the visitor. The instructor can present a more complete picture of what the shop is doing. The students know that they are on display and react accordingly. There are definite exhibits, and the visitor does not need to call so much upon his imagination to get a view of the "why" of shopwork in the school, how well it is conducted, and what it does for the students.

Of course, this expansion of the open-shop idea requires planning. The teacher must work out a definite program for each open-shop day. Dodgers must be worked out which are to be distributed to the entire student body inviting parents and friends to visit the school shop on the days specified. The local newspapers are usually glad to insert a reading notice about school happenings such as these. Arrangements should also be made that all classes with their teachers can visit the shop.

Each open-day program should have a central theme. The first one, for instance, might be worked up around the title, "The Shop at Home and in School."

If possible, have a suitable workbench set up surmounted by a simple tool rack containing a minimum assortment of tools which the homecraftsman needs. Lists of additional tools which will be found desirable should also be shown, together with actual examples of power tools, or catalog pictures of such tools. Home-shop layout plans should also be displayed, together with designs of projects, culled from magazines and elsewhere, to show what can be done in the home workshop.

At the same time the teacher should not forget to show what objectives underlie his own work in the school shop. He may be able to sell some parents on the idea of providing home-shops for their sons.

Another visiting day may be arranged around the title, "The Student Entering Industry." Here the idea of how the work done at the school shop is made to dovetail with the vocational guidance given to the student. The parents may be appealed to so that they will cooperate in making the guidance work of the school more effective.

Local businessmen may be circularized for this particular open-shop day in order to gain their good will and to give them an opportunity to see for themselves how anxious the school shop is to cooperate with them in the solution of the problem of adjusting the boy to the world of work.

A third interesting program could be built around the title, "What Home Mechanics in the School Means to the Home."

A display of the lessons used in this work together with an exhibit of pieces of furniture that have been repaired at school may make an interesting and instructive picture. At the same time display boards might be used to show how various repairs to chairs, tables, lamps, and upholstered articles may be made.

Then there are other opportunities for exhibits, such as birdhouses, airplane models; model boats; miniatures showing civic planning projects, slum-clearance projects, and the like.

The last program of the year may well be used for a composite exhibit of all of the work done during the year, re-exhibiting the better pieces used during the previous programs and adding to it exhibits of work done by as many homecraftsmen as can be induced to enter their work.

Programs of this kind will entail much work. There will be many disappointments, but in the aggregate, the publicity gained for the school shop, will be very much worth while.

Translating a Philosophy into Practice

HARRY A. JONES

Inspector, Department of Education, Victoria, British Columbia, Canada

The task that I have set myself is that of indicating how, in actual practice, the philosophy underlying the new curriculum in the practical arts and sciences may be put into practice in the junior and senior high schools of British Columbia.

After many years as a teacher in a technical school I had the opportunity of viewing, on the one side, the school system, and the organization of industry; and in the opinion of the writer the greatest respect must be shown to industry when judged on the following points; organization, leadership, research, advertising, vocational guidance, practical teaching methods in relation to employees and the public, internal discipline, up-to-date equipment, correlation and co-ordination between departments.

Dr. H. B. King, technical adviser to the Department of Education, Victoria, B. C. presented us with the philosophy underlying the new curriculum for junior and senior high schools, and his leadership and quick insight into the technical interpretation and application of the new plan were very stimulating to those of us who have been serving on curriculum committees. The plan has been worked out in detail and copies have been sent to teachers of industrial arts.

What can the school learn from modern industry?

In the first place, it could very well learn to train pupils in courses suited to their native ability.

Henry Ford has ten main ratings for beginners in his industry. He places workers according to their native abilities. If they show more ability than the job calls for, they are advanced in grade; if less, they are demoted. He does not try to make a silk purse out of a sow's ear, as so many teachers are asked to do. Students of the less gifted types require a reduced curriculum and plenty of repetition. A student may be quite a success in a "D" type course, and a total failure in an "A" type course. It is poor business to spend too much money in training pupils for work that nature apparently never intended them to do.

The new curriculum for junior and senior high schools offers many varied types of courses of "A" rating to suit the needs of the pupils and the industrial needs of our province. It is hoped that courses rated "B," "C," "D," etc., will be developed later in the proposed so-called Vocational School.

In the second place, if those responsible for the schools are prepared to learn from big business, school shops and classrooms will become conspicuously better equipped in the matter of illustrative teaching aids.

Take another look at the way Henry Ford does things.

The Ford Motor Company has scrapped equipment valued at $175,000,000 during the last eight years and replaced it with equipment valued at $217,000,000.

In this company a thing is obsolete, no matter how good it is, as soon as a better appears. Better equipment, under expert direction, enables a worker to produce more and better work and thus enhances his individual usefulness. This creates greater profits for the producer, more wages for the worker and higher values for the customer, with the result that everybody is benefited.

The school problem is very different but lessons may be learned from this example. As teachers of the practical arts we are concerned with three things: the pupil, the school, and the industry. Some classrooms are bare pre-Victorian hostels of an inbred system of so-called education, boasting only of books, blackboards, chalk, and places to sit down. How can one receive an education for industry in such an environment which furnishes neither incentive nor interest?

What does industry offer schools in which an attempt is being made to remedy these conditions? Plenty of free bulletins, the result of research, charts, samples, models.

Pictures are better than words, and real things that one can feel are better than pictures. Words give only a limited understanding; drawings or pictures and real things give complete understanding. Let us give our pupils an opportunity to get this. Teaching in night schools for 19 years, I have observed pupils in school and the same pupils after they have left school, and I must admit that the educational effect of industry on the pupil is far greater than that of the school. This is due in part, no doubt, to the young person's increasing maturity, but it is due still more largely to the real situations and repetition that he meets in industry.

The employed feel competition, drive, and discipline. Marks in school become wages in industry, and instead of being carried through a year, the workers are fired or given a less exacting job if they show inefficiency. A pupil who had gone to work once remarked that every boy should be compelled to spend at least one year in industry after passing through the elementary grades; he would then appreciate his high-school training.

From industry we should also be able to learn much regarding correlation between mathematics, science, English, drawing and shopwork.

The automobile industry works as a complete unit. Artists, designers, pattern-makers, foundrymen, toolmakers, pressmen, machinists, and the rest, all work together for the good of their product. In some schools, on the other hand, there are water-tight subject compartments which do not function with maximum efficiency for the all-round education of the pupil. The practical-arts teacher can do much to help by the preparation of teaching devices for the new curriculum and by the development of real situations to stimulate pupil interest.

Let us examine some of the correlations which should result.

At least some practical mathematics should be taught in a graduate high-school course. Practical jobs should be mounted on boards in two stages: (1) before the problem in mathematics is solved and (2) after the problem is solved and successfully applied. These boards can be moved around the school as needed, and the pupil is motivated and gains respect for the importance and usefulness of the subject he is studying.

Drafting involves reading drawings, geometry, shop sketching, and instrumental drawing. The peculiar feature of drafting is that it is a universal language. The pupils should get practice in translating ideas or words into drawings and making a drawing from a given job. Shop sketching should be taught in carefully planned units. The pupils should visit the school shops and learn the application and function of the parts under study and should then return to the class for a lesson on the technique of the drawing involved in the unit. The blackboard should then be cleaned and the student should take the job mounted on a board and carry out the printed drawing assignment. Judging comes next. On the completion of the unit, the pupil judges his sketch according to the standard on the mounted judging board and marks himself accordingly before the teacher evaluates the completed unit. Under this system the pupil cannot copy. He must do his own thinking and learn to make his own decisions.

Correlation between science and shop-work may be made every effective. The learner should be led to see and appreciate the shop or industrial applications of important fundamentals in science, e.g., those bearing upon hardening and tempering. The pupil will thus discover the actual need for study. The teacher and class might then carry out an experiment in a laboratory involving, for example, the critical periods of decalescence and recalescence. The knowledge thus gained should now be applied to a job and, the work being then subjected to a severe test, the pupil can prove the successful application of the scientific principle which he has been studying.

Every class should be a class in English. Many free technical bulletins may be used for technical reading. An industrial vocabulary may be built up and used in describing operations or machines. Written descriptions may be made from drawings or articles. Required jobs may be described in words and the description may be tested by requiring the student to make from it a drawing or to perform a given job.

Vocational guidance has a very important place in the new curriculum. We can make it practical and of genuine service both to the pupil and to the industry by obtaining and keeping available up-to-date surveys of the industries of British Columbia. Such surveys should show the ratings and number of workers required and should give some idea of the preoccupational training demanded by the particular industries.

The new curriculum is probably going to discourage or alarm some teachers, but such discouragement is quite unnecessary. It is true that the individual teacher cannot possibly carry out the courses as required unless he is given help; but such help will be available. As already mentioned, the Department of Education has established a pool for practical arts and science and, if teachers contribute a little to the pool, they will receive in return the benefit of the contributions of the whole group. The writer believes, however, that this should be treated as a national rather than as a provincial problem. The greater the number in the pool, the greater will be the service to the teacher and pupil. Learning will be rendered easier, educational purposes will be unified, and the training of pupils will become more efficient and practical.

The Relation of the Furniture of the Roman Empire to the Periods that Followed

AUGUST E. EPIFANIA

Coytesville, New Jersey

The true appreciation of any field of art is the natural outcome of having not merely a vague acquaintance with it, but a sufficient knowledge of its origin and development. Most of those who delve in the art of furniture making have little or no knowledge at all as to where our different periods have originated, and how they were influenced directly or indirectly.

The industrial woodworking teacher, the woodworking pupil, and the amateur homecraftsman, should study this phase of furniture design in order to get a worthwhile basis for their own efforts at design.

All of our periods, ancient and modern, European and American, originated directly or indirectly from the classic Roman Empire. The Romans and the Greeks who preceded them laid the foundation for the arts and crafts, including that of furniture making. The history of the Roman period has been often and ably told, but very little, indeed, has been written concerning its household furnishings and interiors.

Roman art in the form of architectural ruins is still in existence, but the furniture of Romans is practically extinct, except that which has been handed down in the form of reliefs on stone, on buildings, representations on vases, fresco paintings, and a few original pieces in stone and marble. There are also a few pieces such as tables, stands, and benches in bronze, which were used in abundance during that period. It is with regret that all the wooden articles have disappeared during the centuries. However, enough data has been gathered that we may benefit from it.

In order to acquaint the reader briefly with the development of our periods, let us go back a few thousand years. Furniture making had its origin with the Egyptians several thousand years before the beginning of the Christian era. Being the originators of the monumental arch, the Egyptians laid down the elementary laws of architecture, art, and other human activities. The furniture used by these early races consisted of seats in various forms, camp chairs, beds, coffers and funeral chests, mostly made of wood and quite crude in form. Other races to follow and benefit by the craft of the Egyptians were the Assyrians, Persians, and Greeks. The last, the Greeks, 1700 B.C., lovers of outdoor activities, developed a type of architecture and art of their own. They strove for simplicity and freedom in design, their construction inclining more toward use then beauty.

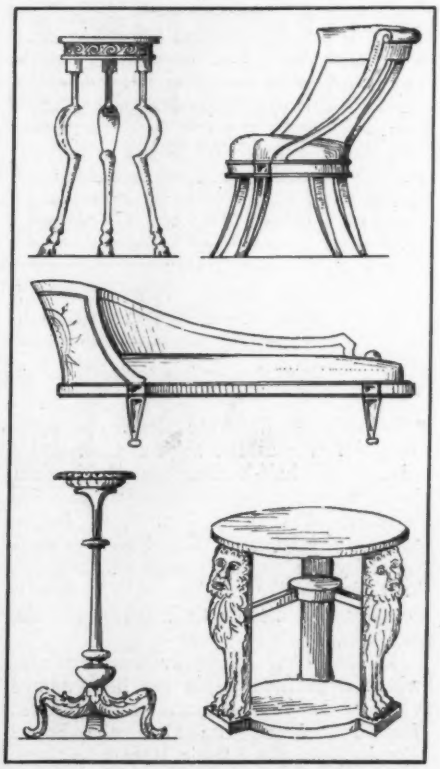


Fig. 1. Various types of Roman furniture

Roman craft developed in the 6th century before Christ from the Etruscans, a branch of the ancient Greek tribes living on Italian soil. Therefore Roman furniture unlike the Etruscans does not run parallel with that of Greece but continues the history where the Greeks end it. Being lovers of pomp and splendor, the Romans partly repeated, changed, and elaborated to their tastes and use the motives of the Greeks. From a wealth of existing objects and those excavated from Pompeii and Herculaneum, embracing domestic utensils, tripods, kettles, shields, and weapons, in silver, bronze, or partly bronze, and from reliefs on stone, terra cotta chests, pictorials, and sculptural representations, we get the idea how Romans furnished their houses.

The Roman household contained low stools and tripods; lampstands in cast bronze; seats; couches (lectus), used at meals, each accommodating three guests; folding stools; chairs with carved legs, and similar to Greek models; beds with turned legs; tables (mensa); chests (arca); and cupboards (armarium). Also important in the house was the marble furniture used for social functions, the latter enriched with figures of lions' paws, horses' hoofs, and sphinxes, and ornamented with anthemion, acanthus leaves, dentils, egg and dart, honeysuckle, husks, frets, lotus, palmette band, urns, medallions, and laurel leaves. Figures 1 and 2 illustrate different types of Roman furniture.

The love for luxury was expressed by the rich upholstery of seats and couches and in the cushions and draperies. Fancy textiles and carpets were extensively used by the Romans to cover tables and floors and to screen off portions of an apartment. These styles prevailed throughout the period, until the very decline of the empire.

The chief woods used were cedar, pine, elm, olive, ash, beech, and maple. The metals were gold, silver, and bronze; and the stones, terra cotta and marble.

With the fall of Rome (A.D. 475) the Barbarians swept over Europe and the furniture craft became very obscure and

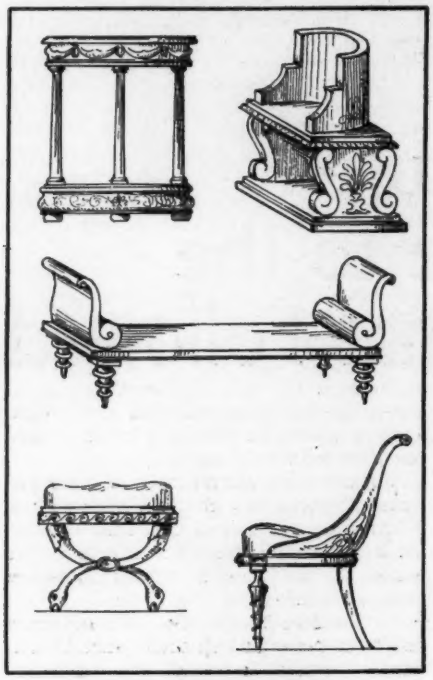


Fig. 2. Other examples of Roman furniture

fell to its lowest state. The early Christian era showed its influence in the craft, (Byzantine 6th to 10th century) followed by the Romanesque (12th and 13th Century). The Byzantine periods were also influenced by the rich decorations of the near East. The Church influence then Christianized Europe, and under its influence the Gothic style dominated in architecture and in the arts and crafts.

The Renaissance, in the thirteenth century, gave birth to new domestic arts and decorations, and more freedom and luxury in the modes of living. Master craftsmen turned to the Roman classic as the best medium for expressing this new spirit. The movement began in Italy and spread to the rest of Europe, from Italy to France and England, Spain, Germany, the Netherlands, and the Scandinavian countries. The Flemish in particular showed this new spirit in their construction, motifs, and carvings.

Later the craftsmen of the Louis XIV, XV, and XVI periods, turned back to the classic for their inspiration. The former was plain, straight, and rather bulky in form, while Louis XV and XVI shows clearly the Roman motifs in its delicate and elaborated carvings and beautiful curved surfaces.

In later years the Adam Brothers adopted the classic as their medium in their architecture and furniture. They made extensive use of the Roman acanthus leaf, egg and dart, dentils, vases and urns, husks, scrolls, mythical figures and other typical decoration.

The French Empire period also goes back to the classic for its motifs. Their chairs, tables and cabinets were designed principally to illustrate the mythologies. Animal forms as the sphinx, ram, and a mixture of half-human and half-animal forms were represented in this style. The furniture was painted gold to further emulate the Romans. Napoleon was motivated by the ancient conquerors not only in their warlike ability and passion to conquer, but also in their domestic living and arts.

Duncan Phyfe, the only American after whom a furniture style has been named, came under the influence of the English furniture of the late 1700, the French Empire, and the Classic Roman.

Last is the Art Moderne, developed in France a few years before the World War, possibly influenced by the French directoire style, and possibly also the classic.

The chart will give the reader quite a clear picture of the origin of our modern furniture with the influence and bearings the different periods and styles had on each other.

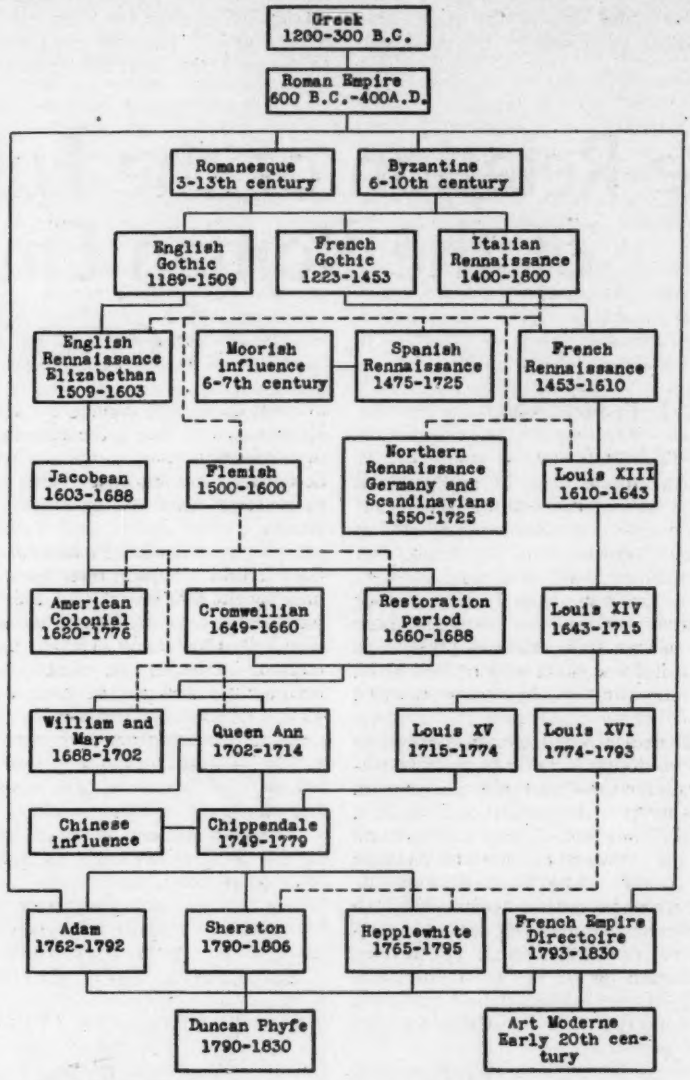


Chart showing how the early furniture periods influenced succeeding periods

"Every child needs as much as he can get of the knowledge of the world and the wisdom of the ancients to help him meet the issues of life, but he needs also personal touch and experience in the world of today that he may know how to meet and deal with the world of tomorrow, when he will be a man with maximum responsibilities. Accordingly, I propose that one fourth of the time of our school children be devoted to something distinctly vocational." —*Eugene Davenport.*

"The best way to learn anything which has to be done after it is learned is always to be a-doing it while we are learning." —*Aristotle.*

Dress up Your Mechanical-Drawing Room

EDGAR FARR RUSSELL

Central High School,
Washington, D. C.

A mechanical-drawing room in the high school may be more than just a place for pupils to report for drawing. It should be more than just a room with desks, stools, a course, and a teacher.

For the drawing room to return a real dividend on the amount invested, the room itself should be an inspiration and a pleasure to each pupil and an explanation of what mechanical drawing may lead to in this industrial age of ours. This may be accomplished to a large extent by the appearance of the room, which may be used to give an atmosphere of engineering and industry. The drawing room walls offer an opportunity for an ever changing exhibit of pictures and commercial drawings, illustrating the part mechanical drawing is taking in the various branches of engineering, architecture, and industry. Different sections of the wall space may be divided for different purposes, and these sections may be further subdivided to present, in some detail, the answers to questions which will probably confront the average drawing pupil.

Almost all students, especially boys, like mechanical drawing. Perhaps in a certain way they know that drawing is connected with engineering and industry, but it is doubtful if they know, even after several years of successful work, whether they can qualify for engineering work, what the entrance requirements to a technical college are, how much it costs to secure a technical or scientific education, and what universities or colleges offer this training. In many high schools, a trained adviser takes care of the vocational guidance of pupils; he carries the burden of explaining the different professions and vocations, whether medicine, law, engineering, salesmanship, or one of the many trades. The work of this adviser, if the school is fortunate enough to have one, will be materially helped if the mechanical-drawing pupils have a clearer knowledge of engineering and the industries, gained through the atmosphere of the mechanical-drawing room.

Conditions and requirements vary from one locality to another, but in general there are certain basic facts which may be conveyed to the pupils by means of the drawing-room wall space. An old Chinese proverb says, "One picture is worth a thousand words." The accompanying picture was, therefore, used to show a possible arrangement of a drawing room, which will make clear what the author is trying to convey.

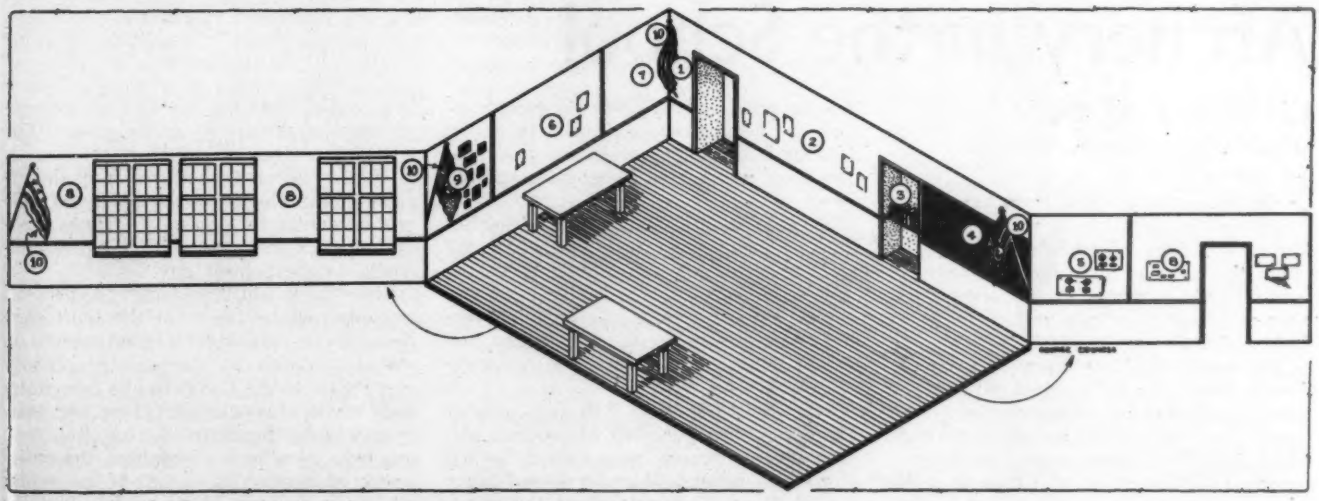
1. *Information and Pictures of Engineering Colleges.* Typical pictures of the work done by the different classes at an engineering college may be posted on a bulletin board. Campus views also may be added to stimulate interest. Information as to entrance requirements, courses, and expenses should be a part of this exhibit. These pictures and information may usually be obtained directly from the colleges for the asking, and frequently also from the college bureau of the high school.

2. *School Notices.* A space should be reserved for the news of the school itself. This may contain information on what the related classes, such as physics, chemistry, mathematics, or shops are doing. This helps co-ordinate, during high school, the mechanical-drawing course with other subjects. If scholarships are available to technical colleges, here is a good place to call them to the pupils' attention. Likewise, if positions, especially in drafting, are open to high-school graduates, these notices may be posted. Many pupils, of course, do not go directly to the technical college, if at all; and if a job can be provided based on high-school training, then the mechanical-drawing course offered will to a great extent have justified its existence.

3. *Drawing Information, Tables, and Diagrams.* With every course, especially as it advances to elementary machine design, various data, such as tables, charts, and diagrams, are necessary. Even if these data are included in the text, further illustration is usually beneficial. Such information may be posted for all pupils to see. News about scientific research at institutions and colleges, if it is of such type as to be understood by pupils of high-school age, may be posted also. Pictures of industrial development and engineering achievements have a place in this exhibit. Aviation news is always of interest.

4. *The Blackboard.* Only a small space has been shown for the blackboard. If conditions justify, this space may be larger. Here is an excellent place in which to work out, before the pupils, these simple problems in mathematics which so often trouble the student. The different steps in the learning of mechanical drawing can be clarified at the board, as for instance the presentation of orthographic projection, isometric drawing, cabinet drawing, and the like. Assignments and notices also may be written upon the board.

5. *Drawings.* Commercial and industrial drawings and blueprints, the kind which are actually used in good practices in the



A method of dressing up the drafting room to increase its efficiency

engineering world, may be displayed for the inspiration and guidance of pupils. These may frequently be secured from engineering companies, public utility corporations, or architects operating in the vicinity. These drawings, executed in the best possible manner, serve to show the pupils what is expected of a draftsman, as to both technique and subject matter.

6. *Home-Room Notices.* Many drawing teachers, in addition to their classes, have a section of pupils reporting to them each day, whose attendance, school routine, and program selection must be supervised. Many pupils in the home room do not take mechanical drawing. A portion of the wall space should be reserved for their needs, and such notices as school affairs, elective courses offered by the school, school rules, and college entrance requirements in general, may be displayed. A small space for home-room notices is usually sufficient.

7. *Civic Section Display.* The wise fostering of civic consciousness is never out of place in any school or classroom. In this section of wall space there is a chance for fostering that which bears on our civic and national life. Posters relating to the Citizens' Military Training Camps, customs and usages pertaining to the flag, notices of the high-school cadet corps, if there is one, the pledge of allegiance to the flag — these are just a few suggestions. Items of local interest should also find their way into this section.

8. *Superior Drawings of Pupils.* Encouragement in any subject is one sure way of obtaining better work; certainly it is in mechanical drawing. One of the best ways of increasing incentive is to tack up the best drawings of the pupils in a large space provided for that purpose. Advanced work, executed in a creditable manner, often encourages the beginner to compete with his fellow pupil and to try to achieve the same results as the more advanced pupil.

9. *"Hall of Fame" Section.* Toward the end of each year or at convenient times during the year, collect and frame interesting pictures of the outstanding pupils, with their hobbies, particularly those connected with aviation, radio, engineering, and so on. Such photographs will make this spot in the room a never-ending place of interest. You will be surprised, after a few years, to find that your expert model-airplane maker is a pilot in the Marine Corps, that one of the best draftsmen in class has become a figure in the radio world, that your neatest and most artistic pupil is working on a large mural for the government. You will be proud when your present pupils ask questions about the personages presented in this "Hall of Fame." There is no doubt that the achievements of former pupils are an incentive to the present group to make good. Frames for the pictures may come from the woodshop, if you find the woodshop teacher willing to cooperate with you, or the frames may be bought from the nearest ten-cent store. Try framing your notables.

10. *Color.* Who does not respond to color? How about a new American flag in the corner over your desk? And the school flag in the other corner? If you are the faculty adviser of a club connected with the drawing department of your school, it is quite appropriate to display the club flag in a corner too.

Watch your own room improve from day to day. Remember that, while the average pupil is in your room for an hour or so five days a week, you yourself are there all day and from year to year. Put items of interest to yourself in your schoolroom also. You live and work in that room. Express your own personality in some nook or corner, and the pupils' interest in you will increase.

Other ideas may be developed by the individual teacher to suit his own tastes, local conditions, available funds, and so on. Where it is necessary to provide something on which to fasten displays, beaver board is suggested. It may be painted to harmonize with the room. The high-school shop can often help cut the board and put it into place. Dark green or brown burlap is also satisfactory for display purposes.

Besides the walls, there are other parts of the room which may be used to create an interesting and pleasant atmosphere. It is desirable to have a small bookshelf or ledge where catalogs from representative technical colleges may be casually scanned or intently searched for information by teacher and pupil alike. A few current industrial-arts magazines are helpful, then quite a number of engineering colleges and universities publish creditable periodicals which are written by their students. These magazines and bulletins can be easily understood by boys in high school.

In the average drawing room there is usually a table or two serving no particular purpose. On these tables may be gathered machine parts, arranged to show how they operate. Often these machine parts may be used in technical sketching. From time to time little exhibits may be given. Pupils taking drawing often make model airplanes, model-railway equipment, boats, and so on. The school shop has plenty to offer in what can be made from working drawings. As an example, the work on the drawing plate about gears may be vitalized by a little display of the different kinds of gears made in the shop. Local firms often have models illustrating their product or machine, which they are willing to lend for a few days.

From the teacher will come the enthusiasm and good workmanship of the class. Many of the foregoing suggestions will be useful in any mechanical-drawing class; if the teacher is a happy combination of engineer, chief draftsman, educator, and showman, the drawing course will occupy an important place in the high-school curriculum and, in the end, in the world itself.

Archery in the School

CHARLES E. KORN

High School and Junior College, La Salle, Illinois

The use of the bow and arrow has played a part in the daily life of man since long before the days of recorded history. In short, the bow has come down through the ages first as a means of procuring food, then as a weapon of war, and finally as an instrument of sport.

Nations of old have depended upon the bow in times of war. In times of peace the use of the bow as a sport activity became so fascinating that kings hailed it as their chief sport for many years. Archery is known as, "The sport of Kings, and the king of sports."

The history of archery in America follows the course of its history elsewhere, in that over here primitive peoples, including the American Indians, used the bow to procure food, and for defense against hostile tribes.

In 1828 Titian R. Peale, a Philadelphian, sent on an exploring expedition through the west, which is now the Middle West, became fascinated with the Indian bows and arrows. Upon his return he organized the first American archery club called the United Bowmen which prospered until the Civil War.

After the Civil War, Will and Maurice Thompson, two penniless Georgians, who as conquered people, were denied the use of firearms, through ill-health needed to live out of doors. They went into the woods with bows and arrows and lived as primitive people. They left a record of their experiences as recorded in the book "The Witchery of Archery" by Maurice.

The fad for archery started from the exploits of the Thompson Brothers, and soon in this country the National Archery Association was formulated which has grown annually to the present day.

Since the World War, archery has spread amazingly. Subdivisions of the sport were necessary to provide for tournaments in various sections of the country. Nearly every state in the Union has its own statewide archery association. There are some county clubs, hundreds of city clubs, and hundreds of schools throughout the entire nation offer archery as a part of the regular health curriculum. Many schools find the making of archery tackle an ideal project

in the school shop. There are many schools maintaining archery clubs as a part of the social activity program.

Archery as Health Education

Archery is taking on a greater importance as an intramural sport form year to year. In many schools and colleges the sport is taught as an important part of the physical education curriculum. Not many years ago instructors admitted a lack of knowledge of shooting technique of the bow, but today it is gratifying to note that physical education teachers as a rule are well versed in the proper methods of shooting and skill in coaching classes of girls and boys to become reasonably proficient archers within a short time.

Underlying the activity there are many health developing advantages. As a corrective it is excellent. It is used so widely for this purpose in some schools that the eye of the average adult accepts archery only as a corrective. The student body may feel the same way about the use of the bow and arrow if too much stress is placed on the sport as a corrective.

The most common faults of posture are low chests, round upper backs, and poor body balance. The stand that archery requires is in itself a complete remedy for these faults. While shooting in correct stance the chest will be arched out, the back flat, and the body must be well balanced. This happens so unconsciously that the archer does not realize the advantages he acquires which is all done without his attention being called to the matter.

Instructors will see that the equipment is not too strong for the student. Girls should use bows with a draw from 20 pounds to 30 pounds, and boys should use bows with a draw from 25 pounds to 35 pounds. The nocking, drawing, and holding of the bow, preparatory to the loose or actual shot, call for correct posture. The effect of the draw on the back and shoulder muscles is one of the best known correctives for round shoulders. Muscular control and breath control are exercised in the drawing and holding. The archer learns to co-ordinate mind and muscle when exercising with the bow and arrow. He has to in order to shoot well. Each student working with a bow of fair drawing force for his age and development gets his full quota of running or walking, bending, stretching, and pulling. A weak bow can, with the walking and pulling, exercise a cardiac without danger of strain.

The lame and partly paralyzed children able to use the hands and arms find archery a godsend. Students who have crippled hands usually find some method or device to aid in shooting. The sport is so fascinating that the maimed will apply themselves and often regain most or all of their former normal physical abilities.

The game shy fellow will forget himself in most cases when he has a bow in hand. For the few, who cannot be reached in class groups, archery is a sport which can be mastered alone in one's own home yard.

Besides the physical educational advantages of archery from the corrective viewpoint, the athletic departments find archery well adapted as an intramural sport. Contests may be arranged, individual against individual, class against class, school against school, out of doors and in doors, team against team, in person or by mail matches.

The July issue of the *American Bowman Review*, 1938, carried an article and several pictures of a high-school girls team shoot which was held June 4, 1938, at Syracuse, N. Y. Twenty-six high schools each sent a team of from four to six girls to compete in this event.

A survey made in 1937, to ascertain the interest in archery in schools, showed an estimate of from 10,000 to 12,000 college girls play the game annually. Some girl schools make archery a required physical-education activity before graduation, the same as required in swimming in some schools.

In 1937 when the Fifty-seventh Annual National Archery Tournament was ended at Lancaster, Penn., it was revealed, a point of especial interest to those in the physical-education profession, that the first four places in the womans' division went to women who had been physical-education majors. Miss Jean Tunney, physical-education instructor at Hagerstown High School, Maryland, won the 1937 womens' national championship. In August, 1938, Miss Jean Tunney, again won the womens' national championship. This fact alone should encourage more instructors to become familiar with archery, for what it can do for school children from a physical-education viewpoint and what it can do for themselves in a like manner.

It behooves other schools to give archery consideration as a very valuable sport and as a part of the physical-education program.

Archery in the School Shop

The modern school shop of today, with its philosophy and exploratory experiences, bases its objective on the value of activity or the project method. The learner's program is not all doing but informational as well. There must be that ideal activity for the students that will give them the widest possible experience manually, physically, and in the printed page; an activity in which ultimate objectives and present interests are so integrated that students will never relax their grip on its appeal. There is such an activity and needless to say it is archery.

Manually it offers work which is attractive in the unit woodshop, or perhaps better in the general shop or the industrial-arts laboratory, in an easily graded series of tasks in wood, metal, feathers, leather, paints and finishes, the string, and several other materials.

The making of archery tackle in the shop is suited to any grade age. Some boys make bows every year from the junior high through the senior high. The tasks grow more difficult as the archer learns to shoot, because then stronger and better-made tackle is needed. The student's interest will not wane because he knows that he will possess bows and arrows for his effort as sport equipment which will give him endless satisfaction. Nearly every tool and many of the machines in the shop will be pressed into use if the student makes all of his tackle. There are unique experiences in making archery tackle which grip and hold the interest of the student. There is a wealth of skills, also, some of which are quite different from ordinary woodshop projects.

From the teacher viewpoint this manual experience is very valuable. The making of archery tackle involves little if any in the way of ironclad technique or "orthodox" procedure. The student discovers and works out many of his problems by himself. There will be some essentials, of course, which he will not be able to understand from the printed page. The chief advantage in this undertaking of trial and error experience lies in the work in crafts which leads to more specialized and individual techniques.

The study of bow woods readily leads to tree identification, distribution, and wood characteristics. This research solves in part the teacher's problem of outside reading or home-study reports.

The fletching (feathering) of arrows has a vast interest often unheard of unless through the exploits of archery. The best kinds of feathers, as well as acceptable types, stimulates further study of the printed page. The color combinations when fletching arrows and when painting arrows are a field of study which integrates with the art area.

Work with arrowheads opens a vast field of reading on interesting historical topics connected with the glamorous history of archery.

The making of the bow and the arrows as a unit to function together calls for precise measurements and calibrations. There is such a thing that the bow and arrows must be matched to function properly for good shooting. The use of the metric system as well as the use of the English system of measurements may be employed. Plenty of familiarity with geometric forms and relations are soon to be found of much value in making precision tackle.

Then there is a far-reaching open field in leathercraft connected with archery in the school shop. The fashioning and tooling of leather into quivers; shooting tabs, finger tips, or gloves; arm guards or bracers; pocket sheaths; bow handles; bow cases, challenges the student's best efforts.

Aside from the tackle mentioned, there are many smaller accessories which unfold a never-ending interest for the lad in the shop. Working in the metal area may be rather extensive if the interest lies in metal handles, bow sights, metal bow tips, hardware for the arrow case, metal ground quivers, and shooting devices. A field of study and shop practice in patternmaking and foundry is involved when the making of some of those accessories is undertaken. Carving ornamental self-nocks, dressing metal bow tips, shaping horn bow tips, cutting and forming whistling arrows, and designing trophies integrate also in the art

area. Boys and girls alike find a wealth of experiences overrun with interest in the wide field of possibilities opened to them in the designing, making, and using of the diverse accessories found needful or at least handy by the professional as well as by the amateur archer.

Archery as a School Club

Not so evident, but none the less popular and interesting, is the archery club as one of the school's social activities. Usually some teacher who is versed in the sport is the faculty adviser of the club. The membership is voluntary and the club meets after school, sometimes in the evening and may meet over week ends. Some school clubs are active through the summer-vacation period.

In some schools home-room organizations are built around student interest, such as a hobby interest. Archery affords a very unique possibility. Boys and girls may be organized as a home-room group, or they may organize to function as a social school club. The activities of an archery club in the school are manyfold. Shooting usually diverts from the regular formal practice of target shooting such as is done in physical-education classes. The games played may be archery, golf, clout shooting, flight shooting, roving, and wand shooting. Sometimes clubs go on hunting trips in near-by woods and fields. Novelty games such as balloon bursting, wild-animal shooting when target faces are pictures of wild animals, and shooting at moving targets are some very interesting forms of the sport. Archery exhibits occasionally during the school year are right in line with other similar activities undertaken by school clubs.

The club does not function only in a physical sense through shooting, but on rainy days, in the winter and for the evening meeting, the club may meet for archery lore. The romance and legend of archery is most fascinating. One hardly knows where to begin. The literature of the world is interspersed with thrilling tales centered about the bow and arrow. Maurice Thompson gave this statement, "As long as the new moon returns in the heavens a beautiful bent bow, so long will the love of archery live in the hearts of men." The famous American epic *Hiawatha* is dear to our memories. There are so many beautiful archery passages in it. Howard Carter's *The Tomb of Tut-ank Amen,* Volume II, tells much about the love that this boy king had for the bow. Robin Hood furnishes the most picturesque material in the English language. The romance of archery would be incomplete if reference to *Toxophilus* by Roger Asham were omitted. *The Story of Ab, Red Eve,* and *Worlds Desire* are works which would especially interest boys. *The Witchery of Archery* by Maurice Thompson and the two books *Hunting With the Bow and Arrow* and *The Adventurous Bowman* by Dr. Saxton Pope, are books relating experiences of hunting from small game to the killing of wild beasts in darkest Africa.

Aside from this lore there are many good books on tackle making.

Literature on Archery

American Bowman-Review, C. C. Hall, Editor, Albany, Ore. A popular American magazine devoting its entire space to archery. Covers all phases of archery. Every school library should have this periodical. Twelve monthly issues. Subscription price $1 per year.

Canfield, James Willard, *Handbook of Archery Terms, Publications and Records* (Albany, Ore.: F. Taylor and Sons, 1936), 56 p. $2.50.

Duff, James Leo, *Bows and Arrows and How to Make Them.* How they are best made for all kinds of target shooting. Including chapters on shooting, accessories, and competitions (New York: The Macmillan Company, 1932), 173 p. $1.

Elmer, Robert Porter, *Archery* (Revised). A complete treatise of archery, including the records of the National Archery Association up to the present time (Philadelphia: The Penn Publishing Company, 1926), 456 p. $5.

Hoogerhyde, Russ, and Thompson, C. G., *Archery Aims.* Archery as a sport with common sense shooting methods (Bristol, Conn.: Archers Company, 1933), 54 p. 50 cents.

Hunt, W. Ben, and Metz, John J., *The Flat Bow* (Milwaukee: The Bruce Publishing Company, 1936), 64 p. 50 cents.

Klopsteg, Paul E., *Science Looks at Archery.* Making a Bow with Rectangular Limbs (with instructions and diagram). (The Author, Central Scientific Company, Chicago, Ill. $1.)

Lambert, Arthur Wilson, Jr., *Modern Archery* (New York: A. S. Barnes and Company, 1929), 306 p. $3.

Pope, Saxton Temple, *Adventurous Bowman.* Field notes on African Archery (Putnam Publishing Company, 1926), 233 p. $2.50.

——— *Hunting with the Bow and Arrow* (San Francisco: J. H. Barry, 1923), 245 p. $2.25.

——— *Study of Bows and Arrows* (Berkeley: University of California, Cambridge University Press, 1930), 112 p. $2.50.

Reichart, Natalie, and Keasey, Gilman, *Modern Methods in Archery.* A text for students and teachers in fundamentals of target shooting (New York: A. S. Barnes Company, 1936), 132 p. $1.50.

Rounsvelle, Phillip, *Archery Simplified.* A text widely used for teaching archery in the school (New York: A. S. Barnes Company, 1931), 120 p. $2.

——— *Students Handbook of Archery.* For all beginning archers (New York: A. S. Barnes Company, 1932), 64 p. 25 cents.

Shane, Adolph, *Archery Tackle.* How to make and how to use (Peoria: Manual Arts Press, 1936), 112 p. $1.75.

Spencer, Stanley Farwell, *Spencer System of Shooting the Bow* (San Pedro, Calif.: The Author, 1933), 100 p. $2.

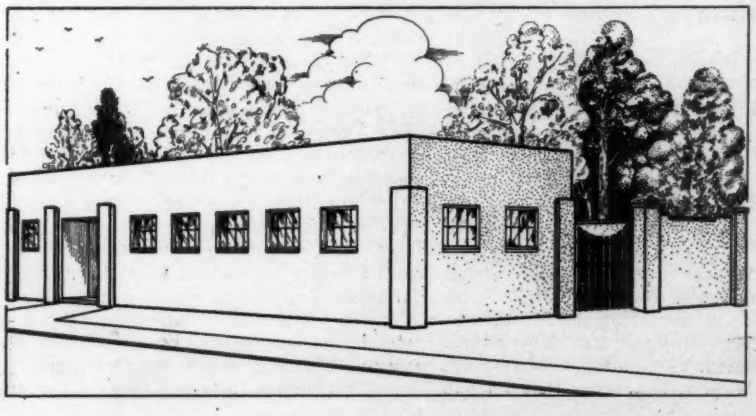
Thompson, J. Maurice, *The Witchery of Archery.* With an Added Chapter by Will H. Thompson (Pinehurst, N. C.: The Archers Company, 1928), 259 p. Now $1.

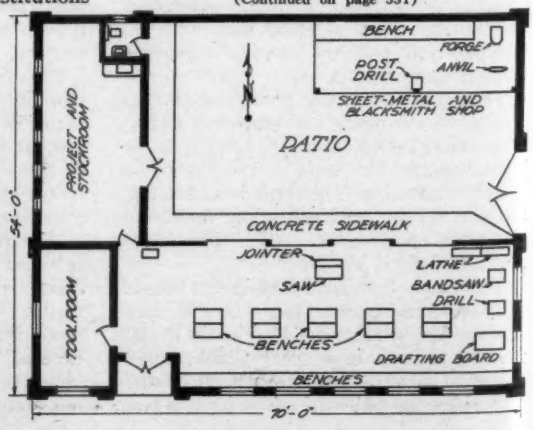
Open-Air Shop

E. C. NASH
Superintendent,
Amphitheater Schools,
Tucson, Arizona

During recent years a number of high schools in various states have provided separate shop buildings for industrial arts and vocational agriculture. This idea is endorsed and encouraged by many if not all federal and state supervisors in these fields. For school districts with relatively high assessed valuation this is probably an ideal situation, but the amphitheater system happens to be one of the many institutions which has rather limited financial resources. For that reason we have devised and constructed a type of shop building which, we believe, will be satisfactory as a general purpose shop, particularly in sections where mild climatic conditions prevail.

(Continued on page 331)





Amphitheater School, patio shop building

AMERICAN STANDARD BOLTS AND NUTS

SIZES SHOWN BELOW ARE FOR UNFINISHED BOLT HEADS AND NUTS

NATIONAL COARSE THREAD			TAP DRILL	HEADS				NUTS			
				DISTANCE ACROSS			THICK-NESS	DISTANCE ACROSS			THICK-NESS
DIA. OF BOLT	THDS. PER IN.	DIA. AT ROOT OF THDS.		FLATS	CORNERS			FLATS	CORNERS		
				HEX.-SQ.	HEX.	SQ.		HEX.-SQ.	HEX.	SQ.	
1/4	20	.1850	13/64	3/8	.414	.498	11/64	7/16	.485	.584	7/32
5/16	18	.2403	1/4	1/2	.552	.665	13/64	9/16	.624	.751	17/64
3/8	16	.2938	5/16	9/16	.620	.747	1/4	5/8	.691	.832	21/64
7/16	14	.3447	3/8	5/8	.687	.828	19/64	3/4	.830	1.000	3/8
1/2	13	.4001	27/64	3/4	.827	.995	21/64	13/16	.898	1.082	7/16
9/16	12	.4542	31/64	7/8	.966	1.163	3/8	7/8	.966	1.163	1/2
5/8	11	.5069	17/32	15/16	1.033	1.244	27/64	1	1.104	1.330	35/64
3/4	10	.6201	21/32	1-1/8	1.240	1.494	1/2	1-1/8	1.240	1.494	21/32
7/8	9	.7307	49/64	1-5/16	1.447	1.742	19/32	1-5/16	1.447	1.742	49/64
1	8	.8376	7/8	1-1/2	1.653	1.991	21/32	1-1/2	1.653	1.991	7/8
1-1/8	7	.9394	63/64	1-11/16	1.859	2.239	3/4	1-11/16	1.859	2.239	1
1-1/4	7	1.0644	1-7/64	1-7/8	2.067	2.489	27/32	1-7/8	2.067	2.489	1-3/32
1-3/8	6	1.1585	1-13/64	2-1/16	2.273	2.738	29/32	2-1/16	2.273	2.738	1-13/64
1-1/2	6	1.2835	1-11/32	2-1/4	2.480	2.986	1	2-1/4	2.480	2.986	1-5/16
1-3/4	5	1.4902	1-35/64	2-5/8	2.893	3.485	1-5/32	2-5/8	2.893	3.485	1-17/32
2	4½	1.7113	1-25/32	3	3.306	3.982	1-11/32	3	3.306	3.982	1-3/4
2-1/4	4½	1.9613	2-1/64	3-3/8	3.720	4.480	1-1/2	3-3/8	3.720	4.480	1-31/32
2-1/2	4	2.1752	2-1/4	3-3/4	4.133	4.977	1-21/32	3-3/4	4.133	4.977	2-3/16
2-3/4	4	2.4252	2-31/64	4-1/8	4.546	5.476	1-53/64	4-1/8	4.546	5.476	2-13/32
3	4	2.6752	2-3/4	4-1/2	4.959	5.973	2	4-1/2	4.959	5.973	2-5/8

DECIMAL EQUIVALENTS

1/64 — .015625	17/64 — .265625	33/64 — .515625	49/64 — .765625
1/32 — .031250	9/32 — .281250	17/32 — .531250	25/32 — .781250
3/64 — .046875	19/64 — .296875	35/64 — .546875	51/64 — .796875
1/16 — .062500	5/16 — .312500	9/16 — .562500	13/16 — .812500
5/64 — .078125	21/64 — .328125	37/64 — .578125	53/64 — .828125
3/32 — .093750	11/32 — .343750	19/32 — .593750	27/32 — .843750
7/64 — .109375	23/64 — .359375	39/64 — .609375	55/64 — .859375
1/8 — .125000	3/8 — .375000	5/8 — .625000	7/8 — .875000
9/64 — .140625	25/64 — .390625	41/64 — .640625	57/64 — .890625
5/32 — .156250	13/32 — .406250	21/32 — .656250	29/32 — .906250
11/64 — .171875	27/64 — .421875	43/64 — .671875	59/64 — .921875
3/16 — .187500	7/16 — .437500	11/16 — .687500	15/16 — .937500
13/64 — .203125	29/64 — .453125	45/64 — .703125	61/64 — .953125
7/32 — .218750	15/32 — .468750	23/32 — .718750	31/32 — .968750
15/64 — .234375	31/64 — .484375	47/64 — .734375	63/64 — .984375
1/4 — .250000	1/2 — .500000	3/4 — .750000	1 — 1.000000

Inclined Letter Alphabet. Designed by Oliver Schade, Head of Industrial Arts Department, Lincoln Junior High School, Rockford, Illinois

(Continued from page 326)

This somewhat unique structure we call a *patio shop*. It is a combination of shop building and courtyard or open-air patio. It is so arranged that in mild weather, which is practically continuous in this area, the large sliding doors leading into the patio can be opened, thereby creating a complete open-air workshop. A wide gate in one side of the patio makes its easy to take large timbers, farm machinery, automobiles, or even horses right inside the patio where the forge, anvil, sheet metal, and mechanic workbenches are located.

Other desirable features and advantages of the patio shop are:

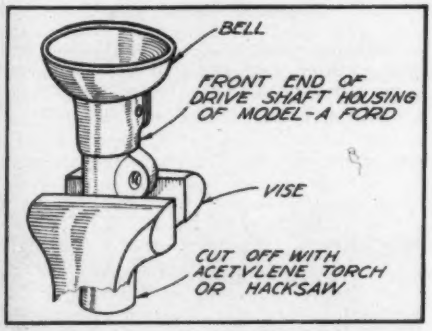
1. It provides opportunity for pupils to work indoors or out of doors according to the weather and the type of work at hand.
2. It offers adequate natural light.
3. It affords a maximum of fresh air, practically free from dust and fumes common in most shops.
4. It provides more square feet of floor space per dollar expended.
5. It gives opportunities for pupils in the same class to utilize the entire facilities of rooms and patio at the same time.
6. It enables the instructor to supervise large classes.
7. It is relatively easy to construct. Ours was built by N.Y.A. boys.
8. It is more economical than two separate buildings — one used for industrial arts and the other as a vocational agriculture shop. In our own case, adobe bricks were made on the grounds and the total cost for building materials for the 54 by 70-ft. patio shop, shown in sketch, was less than $1,200.

Problems and Projects

A USEFUL FORMING BLOCK

George A. Smith,
Quarryville, Pennsylvania

The bell-shaped part which is found on the front end of the drive-shaft housing of a model A Ford, is just the right shape and size for making a forming block for hammering out ash trays or other metal trays having diameters from approximately 2 to 4 in. A former of this type is especially useful in the school shop for boys who are not especially experienced in art-metal work. It has an advantage over the common wood former in that sheet-iron disks may be heated and easily



Utilizing a part of an old drive-shaft housing as a forming jig

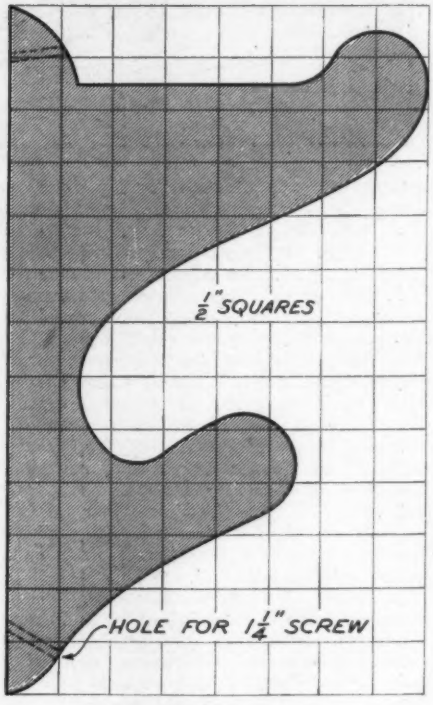
shaped in the former with a ball-peen hammer. A discarded model A Ford drive-shaft housing may usually be purchased very reasonably from almost any automobile repair shop or junk yard. For a few cents extra, a mechanic at the place where the junked part is being purchased, will use his acetylene torch to cut off the bell part, leaving 6 or 8 in. of the drive-shaft tubing attached. The instructor may also do this cutting with a hack saw. The short length of tubing left on the bell serves to clamp the improvised forming block in the vise.

HALL-TREE HOOK

A. H. Thalman,
Graysville, Indiana

The accompanying hall-tree hook was designed in order to cut the cost of hall trees, made in school shops, to a minimum.

Many of them have been cut out of ¾-in first-grade yellow pine, and they have been found to be very serviceable.



Hall-tree hook

RELATED WORK TOPICS — GENERAL METAL

W. H. Bowers,
High School,
Tuckahoe, New York

These related work topics were arranged to go with the general metal course published on page 94, of the March, 1937, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.

1. Safety in the Shop
2. Correlation of Metal Work and Design
3. Early History of the Lathe
4. Development of the Screw Cutting Lathe
5. Brief History of Copper
6. Brief History of Pewter
7. Brief History of Wrought Iron
8. Brief History of Tin
9. Brief History of Zinc
10. The Sheet-Metal Industry
11. The Forging Industry
12. The Automobile Industry
13. Molding and Core Making
14. The Machinist in Industry
15. The Plumbing Industry
16. Heat, and its Effects
17. Annealing
18. Hardening
19. Carbon Formation
20. Shrinkage
21. Strains and Stresses

COPPERPLATING TIN-CAN PROJECTS

Chris H. Groneman,
Industrial Education Department,
East Texas State Teachers College,
Commerce, Texas

While ornamental tin-can craft is comparatively well known, yet its definite use as a part of the metal program in a general shop has not been appreciated to the fullest extent. This is due to several reasons, one of which is that the projects produced are not far enough removed from the appearance of the original tin can. Copperplating of the project is a very satisfactory means of stimulating interest on the part of the boy and his parents, since there is a place in every home for beautifully finished pieces of copper work.

One must not assume that the copperplated project presents a crude appearance. At a recent exhibit of this work, the visitors were quite impressed with the lovely copper articles displayed. It was necessary to explain to them that the display consisted of tin-can projects which had been copperplated. Patrons were surprised and gratified to learn that the process of electro-plating was a relatively simple, inexpensive one and could be understood by students of the elementary-grade level.

There are several distinct virtues in introducing this activity into a general shop program. The first is its inherent possibilities permitting the correlating of the industrial-arts program with science. The student usually wants to understand what chemical action is taking place and in this way he is initiated into an elementary, practical knowledge of chemistry. Second, this auxiliary activity can play an important role with the students of the electrical division of the general shop. Third, it also aids in "selling" the shop program to the student and to the public, be-

cause the beautiful finish adds greatly to the interest. Fourth, this highly developed craft adds "spice" to the metal division, especially when interest in metal work has been difficult to arouse because of limited equipment.

The copperplating equipment described and illustrated herewith makes use of everyday materials which may be found in any hardware store. These items include an earthenware or stone crock of two- or four-gallon capacity; the water vat which may be made in the school shop from galvanized sheet metal or may even be a large dishpan; a gas or electric hot plate for heating and maintaining a constant temperature; cathode support which may be a round or square piece of scrap wood; five feet of any available insulated copper wire; two ordinary 1½-volt dry batteries; a thermometer; and a piece of sheet copper.

After securing the necessary materials, the following steps should be observed in order to secure maximum efficiency:

1. *Cleaning* — The importance of cleanliness in plating cannot be stressed too strongly. The article that is to be plated must be cleaned with steel wool, and then washed in hot water and soap. Pickling the project in a 10 per cent solution of sulphuric acid is also a good method of cleansing. The project to be plated is known as the *cathode*. The sheet of copper in the bath, known as the *anode*, must also be washed perfectly clean before each plating job. Make it a rule to start all plating operations by thoroughly washing the hands and then washing the cathode and anode.

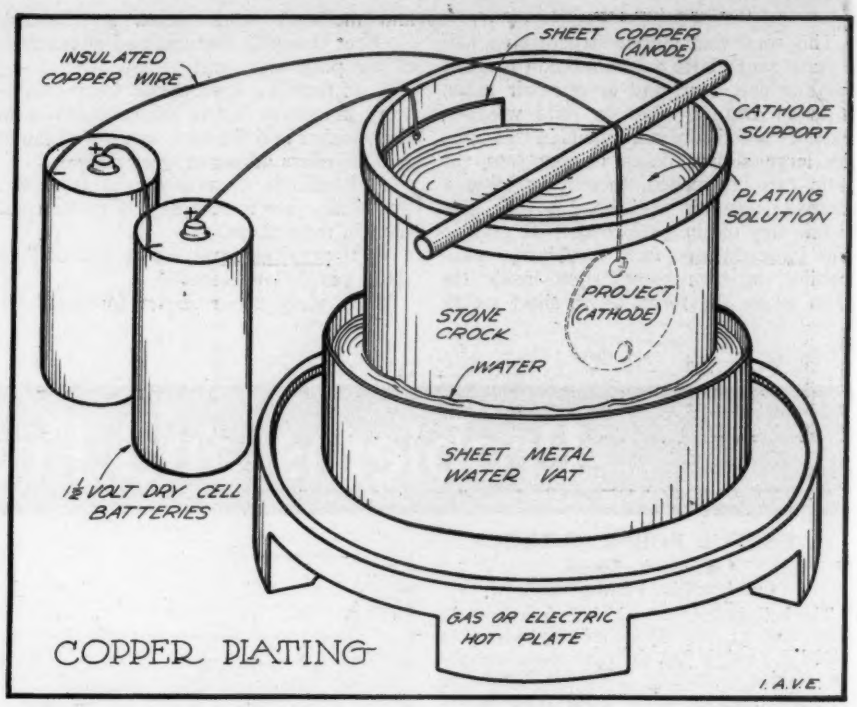
2. *Mixing Plating Solution* — Many formulas are available, but the following one has proved to be efficient and inexpensive. This may be made in the shop or high-school chemistry laboratory according to the following mixture:

Copper sulphate	5	oz.
Sodium cyanide	4½	oz.
Carbonate of soda	2	oz.
Hyposulphite of soda	1/64	oz.
Water	1	gal.

Heat the above solution to 120 deg. Fahrenheit by the method illustrated.

3. *Required Voltage* — Copperplating with the enclosed formula requires three volts. Be sure that all connections are properly made.

4. *Assembly* — If a nonmetallic lid cannot be purchased to fit the crock or jar, it is advisable to store the solution in bottles or containers which are not metallic. Before beginning to plate, be sure that all preliminary operations have been completed and checked. Then heat the solution to a temperature of 120 deg. F. The proper temperature may be obtained by checking with a thermometer.



5. *Plating* — Stir the solution occasionally while the plating action is taking place. Do not allow the cathode and anode to touch. Be sure that the project is entirely immersed in the solution during the plating action. One to two hours are required for plating each project. Although the volume of solution decreases, its strength is not appreciably affected, due to the copper salts remaining and only the gases breaking up and evaporating. Water may be added from time to time to keep the volume regulated. This mixture sometimes lasts for a period of six months without adding salts.

6. *Final Cleansing* — Rinse the plated article in hot water, and allow 20 to 30 min. for a thorough drying, then clean and polish with steel wool until it becomes glossy. Apply one or two coats of clear brushing lacquer immediately to prevent oxidation.

SHOP DISPLAY CASE AND CABINET

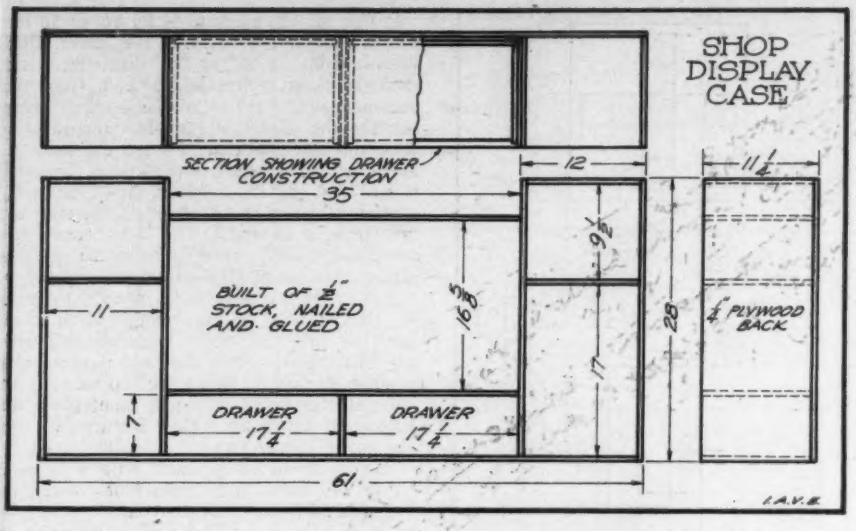
G. Wesley Ketcham,
Senior High School,
Norwalk, Connecticut

Modern industrial-arts departments, like well-organized commercial or industrial concerns, should provide some means of maintaining a shop display of their finished work. A

Cabinet with superimposed display case

A B C D E F G H I J K L M N
O P Q R S T U V W X Y Z
a b c d e f g h i j k l m n
o p q r s t u v w x y z
1 2 3 4 5 6 7 8 9 0 ½ ⅜ ⅝ 7/16 52 5/16
IN ARCHITECTURAL LETTERING
SPACING IS MOST IMPORTANT

An alphabet for the architectural drafting room. Submitted by W. Ben Hunt, Hales Corners, Wis.



Display case details

formal display area will often become a practical unit to which a principal, supervisor, or visitor may refer as an example of the results obtained from the various units of activities carried on within the room.

Through the use of a display case, interest and pride in student accomplishment frequently stimulates a more careful and more critical form of workmanship on the part of the shop students. At the same time the cabinet solves, in an orderly fashion, the problem of caring for projects until they are taken home by the shop students.

Many shop teachers are fortunate in having built-in display cases or specially designed cabinets at their disposal. Where such units are lacking, it is often possible to make use of a discarded bookcase. A careful search of store or supply rooms throughout the school building will sometimes uncover a bookcase that has been set aside. If desired, such a case may be reconditioned and wired with showcase electric fixtures.

Occasionally there is need for more space than a single bookcase can supply. If so, an open type cabinet like the one shown on page 332 may be placed on top, thus adding both to the attractiveness of the exhibit and to the available space.

THE SANDPAPER PROBLEM

Paul I. Hauserman,
Senior High School,
Mansfield, Ohio

The following method of handling sandpaper has been found highly satisfactory.

A series of eight pigeonholes are labeled according to the grades of sandpaper, and placed in the toolroom.

The student who takes care of the toolroom, dispenses the sandpaper and records it on the form shown. If a self-serve toolroom is used, each student records his own sandpaper.

Student	SANDPAPER							
	000	00	0	1/2	1	1½	2	2½

At the end of a term or a semester, it is a matter of but a few minutes for the instructor to count the number of pieces of sandpaper used by each student and to compute the cost.

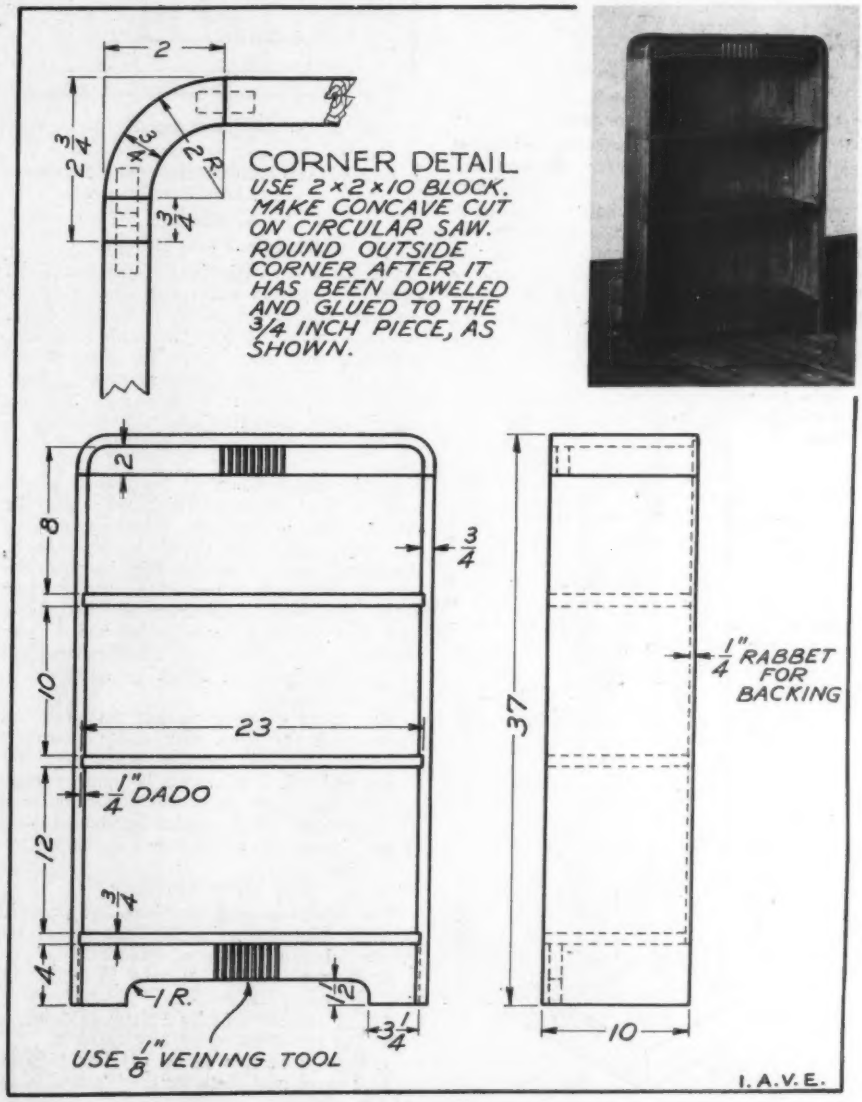
This system has been used in both the self-serve and the student-operated toolroom, and has been successful in both types. The students have been found to be surprisingly honest with either method.

A MODERN BOOKCASE

Roland Bacon,
George Washington High School,
Danville, Virginia

This project may be quite easily constructed by the average high-school boy who has a knowledge of machine woodworking on the ninth- or tenth-grade level. Its straight lines with rounded corners and lack of surface enrichment, except for the veining on the upper and lower rails, give it the modern classification. It is a popular project and appeals to many boys. Any cabinetwood may be used, but preferably walnut, figured gum, or mahogany.

1. Make out a bill of materials.
2. Get out stock in the rough.
3. Square up all parts to the exact dimensions called for in the bill of materials.



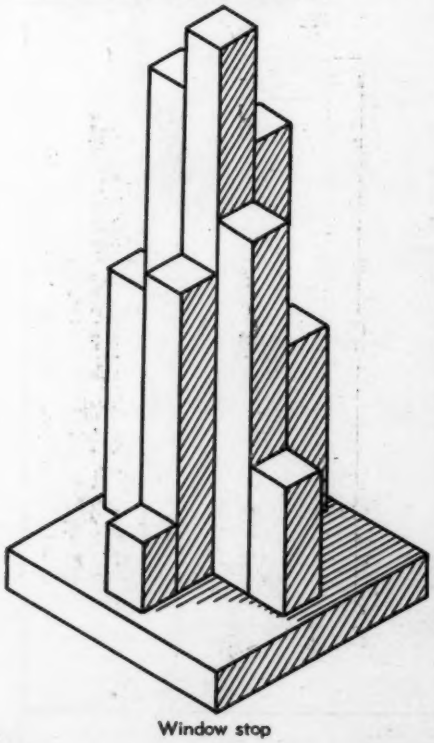
Modern bookcase

4. Lay out, cut, and fit joints:
   a) Dadoes for shelves.
   b) Rabbet for lower rail.
   c) Groove for lower rail.
   d) Dowel joints for top corners.
5. Lay out and cut curved design in lower rail.
6. Make concave cuts on inside corner of blocks with circular saw.
7. Lay out and carve designs with ⅛-in. veining tool in upper and lower rail.
8. Remove all machine marks with a smoothing plane set for a very thin shaving. Scrape those parts on wood which will not become smooth with plane.
9. Do preliminary sanding with No. 1 garnet paper.
10. Assemble the parts:
   a) Glue the shelves into the sides with fish glue and finishing nails with heads recessed.
   b) Glue top in place, also lower rail.
11. Fasten plywood back in place with small flathead wire nails.
12. Round upper corners with plane.
13. Do final sanding with No. 2/0 or 3/0 garnet paper. Fill all nail holes with plastic wood and sand down.
14. Apply finish of oil stain, three coats of thin shellac rubbed down with No. 3/0 steel wool, and then apply wax polish.

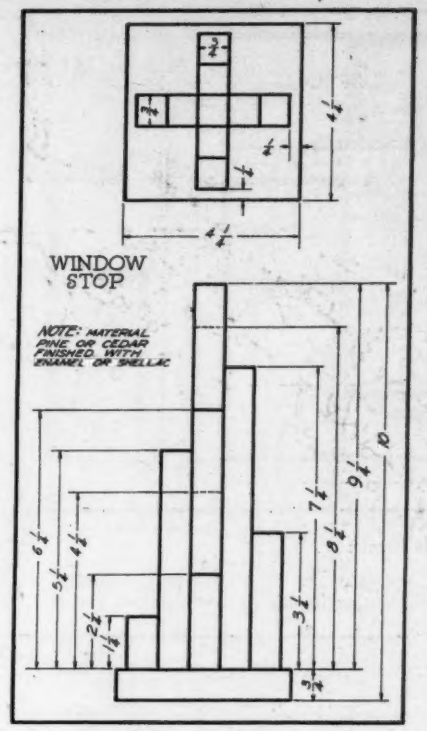
WINDOW STOP

Carl Engelbach,
Greeley, Colorado

For people who live in homes where window weights were omitted and the windows will not stay open the desired amount, the stop described and illustrated herewith will be found quite satisfactory. It will keep the window raised to 10 different heights, varying from ¾ to 10 in. Simply raise the window the desired amount and place the stop under the sash with the corresponding length bar under it. Since the stop is small, it can easily be left on the sill when not in use.



Window stop



Window stop details

ELECTRIC CONCENTRATION GAME

E. A. Rerucha,
Franklin Park, Illinois

This game is an electrical adaptation of the game often played with cards, in which the cards are spread out of the table, face down, and each player uncovers two cards at a time, seeking to find pairs, which are taken off the board by the player discovering them. Each player is supposed to keep in mind the unpaired cards uncovered and their location on the board so that he may use them to form pairs.

In the game described here, each player seeks to find contacts which will close the circuit to one of the four colored lights which has been assigned or chosen by him. As he discovers a contact for his light he plugs the contact hole with a peg of a corresponding color. The player discovering twelve contacts first wins. Penalties are provided which make the game more interesting. Rules and method of play are given in detail under "How to Play the Game."

This is an excellent project for providing opportunity for work with multiple circuits and one that will provide amusement for young and old. The playing is simple enough so that the young child will understand and be fascinated by it. Junior-high-school boys should be capable of constructing this device.

To Make the Case

The case is made from ¼-in. soft plywood such as bass, fir, or pine. The corners are reinforced with ½-in. square blocks.

1. Prepare four blocks ½ by ½ by 2¼ in. for reinforcing the corners.
2. Cut two sides ¼ by 3½ by 15½ in.
3. Cut two sides ¼ by 3½ by 16 in.
4. Cut the bottom ¼ by 15½ by 15½ in.
5. Prepare two cleats for the bottom, ½ by ½ by 15½ in.
6. Cut the top piece *C* ¼ by 16 by 16 in., with a window 2 by 8 in. in the center. Drill twelve holes, 3/16 in. in diameter, clear through, along each side one inch from the outside edge and spaced one inch apart. These are for the players' pegs. The rest of the area with the exception of a space 3 by 9 in. in the center, is drilled clear through, the holes being 3/16 in. in diameter, and scattered; centers of holes to be about ¾ in. and not more than 1 in. apart. The holes should not be spaced in any certain order so that players cannot note the position of contacts readily.
7. Cut the top piece *B* ¼ by 15½ by 15½ in. Drill 4 holes in the center spaced 2 in. apart so that the center line coincides with the longitudinal center line in the rectangular window in part *C*. Ream the top side of the holes for the lamp bulbs and counterbore the bottom of the holes with a Forstner bit for the rim of the sockets.
8. Cut the socket retaining strip *A* ¼ by 3 by 9 in. Drill and counterbore holes on longitudinal center line to coincide with the holes in part *B*, and of such a diameter as to accommodate the necks and rims of the sockets. Drill ⅛-in. holes along the edge in the center of each side for attaching screws.
9. Assemble the case with glue and ½-in. No. 20 wire nails. Place the top part *B* on part *C* so that a ¼-in. margin is left all around, and with the reamed side of the holes toward the window in part *C*. Glue and nail together. Now drive a 1-in. No. 17 wire nail into the center of each 3/16-in. hole drilled in part *C* and with a nail set drive the heads down into the holes so that they are flush with the surface of part *B*. These nails serve as the contacts for the circuits.

Assemble the sides of the case. Start with gluing and nailing the corner blocks to the 15½-in. pieces. Place top in place and nail down with ¾-in. No. 18 wire brads. Sand all edges round and finish case with stain and varnish or enamel. Clean the holes and surface of the nailheads after the finish is dry to make sure that holes will admit pegs and that contacts can be made with the leads. This may be done with a square point drill.

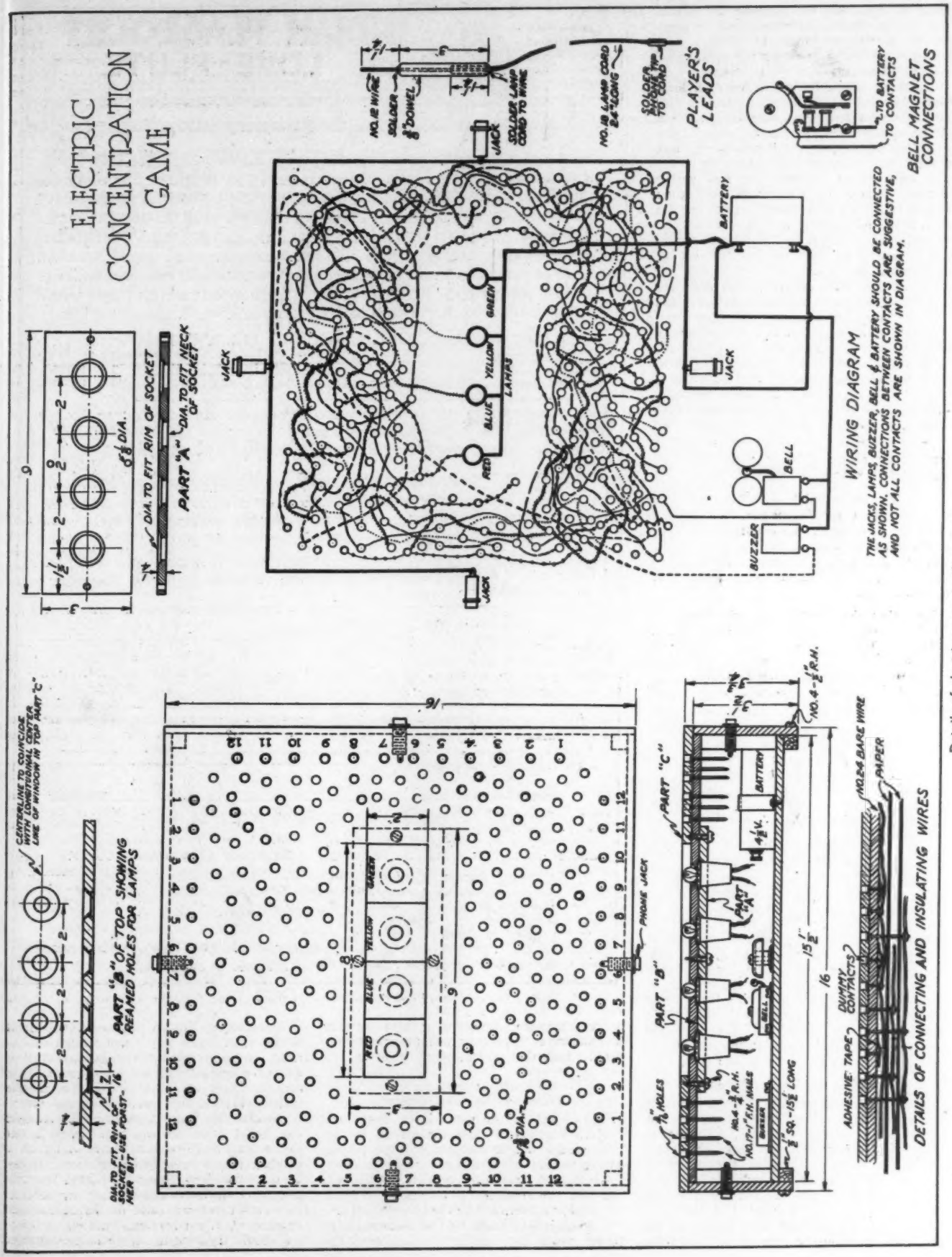
Paint a two-inch square about each lamp hole, each of a different color, to match four different colors of golf tees which are used for pegs. If four different colors of golf tees are not obtainable, the pegs will have to be painted to match the squares.

Nail cleats to base and mount the buzzer, bell, extra gong, and battery. The extra gong is mounted on a piece of thread spool in such a position so that it will be struck by the hammer of the bell on the rebound.

Making the Electrical Connections

It should be remembered:

1. Mount the sockets in place with the retaining strip *A*. Screw this strip to the top with No. 4 ¾-in. r.h. screws.
2. Clip off the ends of any ten nails, located at various places on the board, flush with the board. Cover the ends of the nails with a piece of adhesive tape to prevent touching the bare wires of the first circuit. These are *dummy* contacts and are not connected to the circuit.
3. Using No. 18 flexible rubber-covered wire, connect one terminal from the bell and buzzer and one lead from each socket to a common wire running to one terminal of the battery. The lead from the sockets to the battery should be about 20 in. long so that the top may be set aside for inspection and replacement of battery when necessary.
4. Drill holes ⅜-in. in diameter in the



Details of electric concentration game

middle of each side of the case for phone jacks. Mount jacks and connect all to same lead and to the other terminal of battery. The lead from the last jack to battery should also be about 20 in. long.

5. Connect the bell, buzzer, and each light to nail contacts on the board. Each light and bell and buzzer have their own circuit which will be closed when the players connect the leads from the jacks in the side of the box to one of the connected contact points in the holes on the top of the case. See wiring diagram. Connect up one circuit at a time using bare No. 24 copper wire, except for the leads from the sockets, bell, and buzzer, to the first nail, for which No. 18 rubber-covered wire is used. Start with the free terminal of each device and make one turn about the nails with the wire, selecting nails scattered over the entire board and in no certain order. Press the wire down against the board and solder to nail. Be careful that the bare wire does not come in contact with any other nails except those to which it is soldered. The number of contacts suggested for each circuit is as follows: bell 25; buzzer, 25; each lamp 35, total of contacts 200. After soldering each circuit, clip off the ends of the nails connected above the soldered connection. Cover each circuit with a piece of tough paper or Bristol board which is pressed down over the nails yet to be connected. Each piece of paper is 15½ in. square and has a window 2 by 8 in. in the center for the sockets. Wire up and cover the next circuit and continue thus until all the circuits are connected.

6. Screw lamps in sockets and paint to match the painted areas around each one. Use 4.5-volt lamps.

Rewiring the Bell for Single Stroke

The bell should be connected for single stroke so that when the circuit is closed it will strike the gong only once and when released the hammer will strike the extra gong on the rebound. Trace the wiring circuit of the bell and locate the magnet coil ends. Usually one is connected to the insulated terminal and the other to the insulated circuit-breaker point. Remove the connection to the circuit breaker and connect it directly to the lead running to the battery. See wiring diagram. Tape the connection to prevent grounding. The cover of the bell may be left off.

Making the Players' Leads

Four leads are needed. A 3-in. length of ⅜-in. dowel is used for the handle. In one end a hole ¼ in. in diameter and 1¼ in. deep is drilled and a ⅛-in. hole through the remainder. Solder a piece of No. 18 flexible lamp cord to a piece of No. 12 3½-in. wire, and insert in the hole in the handle. Make a ring solder on the wire at the bottom of the handle to prevent the wire from being pushed in. Solder a phone jack tip to the other end of the lamp cord. The leads are connected to the circuit by inserting them into the jacks on the sides of the cases.

Making the Players' Pegs

Each player will require 12 pegs to match one of the lamp colors. About thirty pegs of a fifth color will also be needed. The pegs are made from wooden golf tees. The lamps should be painted to match the colors of the tees obtainable as already stated. If four different colors of tees are not available, the pegs will have to be painted. Cut the point off each tee so that the total height of the peg is ½ in. Sand the pegs by rotating them between a piece of sandpaper held between the fingers so that they will fit snugly, yet readily into the contact point holes in the top of the case.

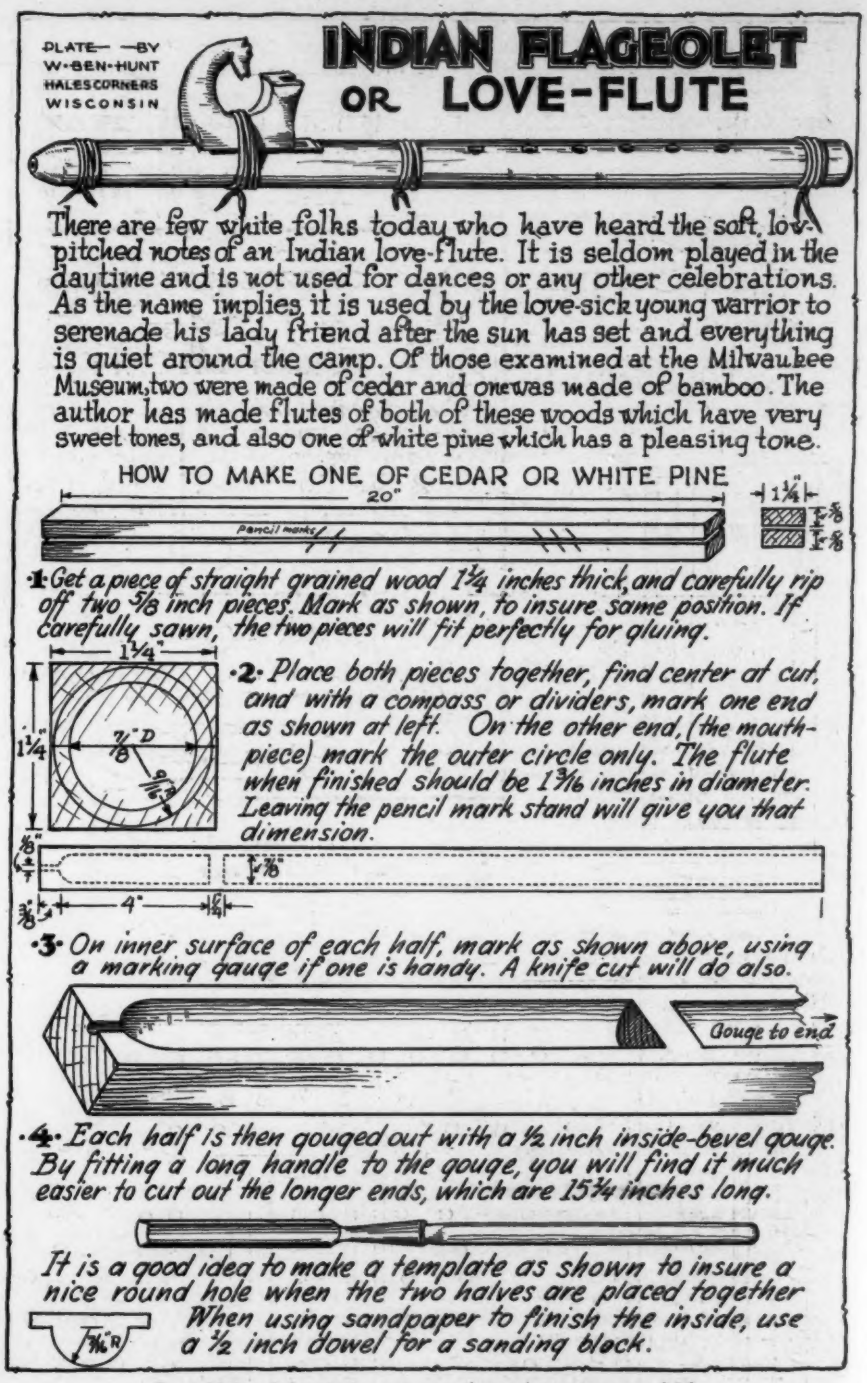


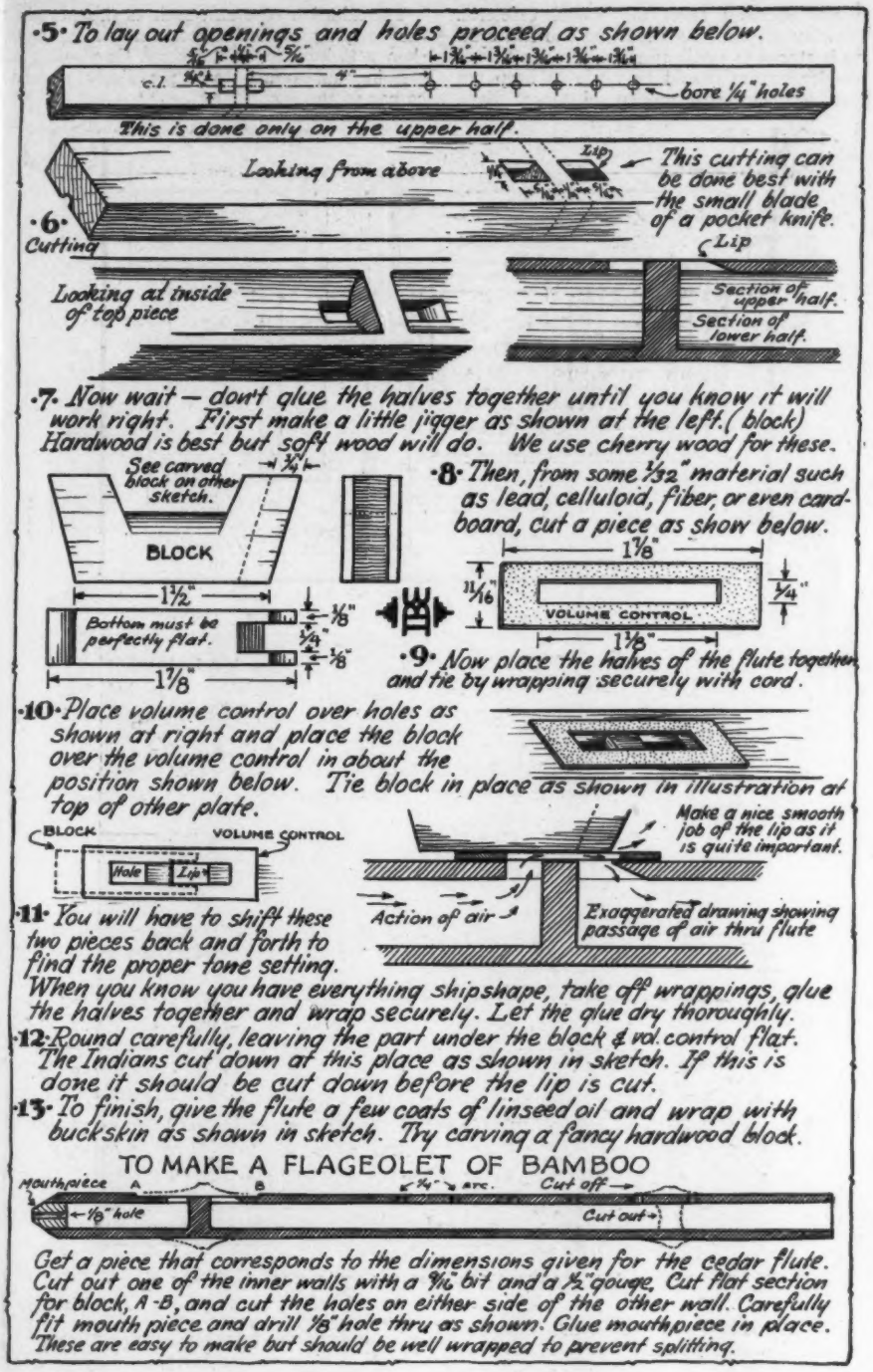
PLATE — BY
W·BEN·HUNT
HALES CORNERS
WISCONSIN
INDIAN FLAGEOLET
OR LOVE-FLUTE
There are few white folks today who have heard the soft, low-pitched notes of an Indian love-flute. It is seldom played in the daytime and is not used for dances or any other celebrations. As the name implies, it is used by the love-sick young warrior to serenade his lady friend after the sun has set and everything is quiet around the camp. Of those examined at the Milwaukee Museum, two were made of cedar and one was made of bamboo. The author has made flutes of both of these woods which have very sweet tones, and also one of white pine which has a pleasing tone.
HOW TO MAKE ONE OF CEDAR OR WHITE PINE
20"
1¼"
Pencil marks
·1· Get a piece of straight grained wood 1¼ inches thick, and carefully rip off two ⅝ inch pieces. Mark as shown, to insure same position. If carefully sawn, the two pieces will fit perfectly for gluing.
1¼"
1¼"
·2· Place both pieces together, find center of cut, and with a compass or dividers, mark one end as shown at left. On the other end, (the mouth-piece) mark the outer circle only. The flute when finished should be 1 3/16 inches in diameter. Leaving the pencil mark stand will give you that dimension.
⅝"
⅜"
4"
·3· On inner surface of each half, mark as shown above, using a marking gauge if one is handy. A knife cut will do also.
Gouge to end
·4· Each half is then gouged out with a ½ inch inside-bevel gouge. By fitting a long handle to the gouge, you will find it much easier to cut out the longer ends, which are 15¾ inches long.
It is a good idea to make a template as shown to insure a nice round hole when the two halves are placed together
When using sandpaper to finish the inside, use a ½ inch dowel for a sanding block.

For additional descriptive notes on these plates, see page 346

How to Play the Game

The object of the game is to discover a contact which will close the circuit to the light chosen by, or assigned to each player. The assigning of light colors may be done by each player making a contact in turn, and the first color contacted, and not yet taken by another player, will be the player's color.

The playing is carried on as follows: Each player places his pegs in the numbered row of holes before him on the board on his side of the case. Each player going from left to right, or counterclockwise, takes his turn in making a contact with his lead to one of the contact points on the board. The color contacted will be indicated by the lamp and if it matches the player's peg color he removes peg No. 1 from his row and places it into the contact hole contacted. As long as a player contacts his color he continues to play. In other words a player is entitled to make a contact until he misses, that is, contacts some other player's color or the bell, buzzer or dummy. When making contacts, the players should try to conceal the holes contacted


·5· To lay out openings and holes proceed as shown below.
bore ¼" holes
This is done only on the upper half.
·6· Cutting
Looking from above
Lip
This cutting can be done best with the small blade of a pocket knife.
Looking at inside of top piece
Section of upper half.
Section of lower half.
·7· Now wait — don't glue the halves together until you know it will work right. First make a little jigger as shown at the left. (block) Hardwood is best but soft wood will do. We use cherry wood for these.
See carved block on other sketch.
BLOCK
Bottom must be perfectly flat.
·8· Then, from some 1/32" material such as lead, celluloid, fiber, or even cardboard, cut a piece as show below.
VOLUME CONTROL
·9· Now place the halves of the flute together and tie by wrapping securely with cord.
·10· Place volume control over holes as shown at right and place the block over the volume control in about the position shown below. Tie block in place as shown in illustration at top of other plate.
BLOCK
VOLUME CONTROL
Hole
Lip
Make a nice smooth job of the lip as it is quite important.
Action of air
Exaggerated drawing showing passage of air thru flute
·11· You will have to shift these two pieces back and forth to find the proper tone setting.
When you know you have everything shipshape, take off wrappings, glue the halves together and wrap securely. Let the glue dry thoroughly.
·12· Round carefully, leaving the part under the block & vol. control flat. The Indians cut down at this place as shown in sketch. If this is done it should be cut down before the lip is cut.
·13· To finish, give the flute a few coats of linseed oil and wrap with buckskin as shown in sketch. Try carving a fancy hardwood block.
TO MAKE A FLAGEOLET OF BAMBOO
Mouthpiece
A
B
Cut off
Cut out
⅛" hole
Get a piece that corresponds to the dimensions given for the cedar flute. Cut out one of the inner walls with a 9/16 bit and a ½" gouge. Cut flat section for block, A-B, and cut the holes on either side of the other wall. Carefully fit mouth piece and drill ⅛" hole thru as shown. Glue mouthpiece in place. These are easy to make but should be well wrapped to prevent splitting.

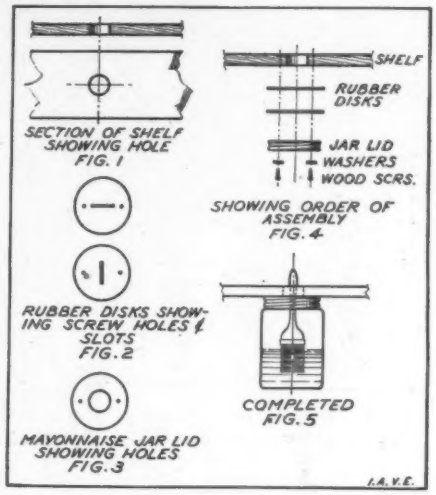
with the other hand and call the color of the light contacted, which all other players should be allowed to see. This is to prevent giving any advantage to the other players by enabling them to spot their color contacts. They will know in what general location a certain color has been contacted but they should not know the exact contact hole.

Play continues thus by all players around the board. If a player has contacted his color at least once, and removed one peg from the numbered row, he is subject to penalty when he contacts a "dummy" or the buzzer. Making a buzzer contact is called *scatterbrains* and making a bell contact is called the *cuckoo*. For contacting a dummy, all pegs of the player making the contact, must be taken off the board and replaced in his numbered row. For scatterbrains contacts (buzzer) any one of the player's pegs must be taken off and replaced in his numbered row. If a player has found at least two or more of his color contacts and has removed two pegs from his numbered row he is subject to the *cuckoo* penalty (bell), in which case he has to remove two pegs and replace them in his numbered row. The holes on the board from which pegs have been removed due to penalties are plugged with a peg of a fifth color. The player who clears his numbered row first wins the game. Other rules for playing will readily suggest themselves.

HANDY BRUSH CONTAINERS FOR THE FINISHING ROOM

R. C. McNabb,
Surrattsville High School,
Clinton, Maryland

In the average school shop, more brushes are ruined by improper care and abuse than are worn out by actual use. As often as not the cause for such misuse and neglect seems to be due to the inconvenience and lack of system used in caring for them. When every brush has a definite place, and emphasis is placed upon the importance of its being there when it is not in actual use; many of the finishing-room problems are greatly minimized.



Method of constructing the handy brush container

Small brushes (2½ in. and under) are most frequently used in the school shop. These may be preserved economically and systematically in mayonnaise jars fastened to the underside of a shelf as shown in the accompanying diagrams.

Holes 1¼ in. in diameter are bored centrally and at regular intervals through a narrow shelf. The same size hole is also drilled or filed in the center of the jar lid. Then two (or three) small holes just large enough for the screws to go through are drilled near the rim of the jar lid as shown in Figure 3. Next two circular disks, slightly larger than the jar lid, are cut from an old inner tube and holes and slots cut in them as indicated in Figure 2.

The parts are then ready to be fastened to the shelf. The order in which they are placed is shown in Figure 4. Care should be taken to see that the slots in the rubber disks are perpendicular to each other. They will then grip the brush handle firmly so as to make the container practically air tight, thus preventing excessive evaporation.

After the jar tops have been fastened in place and labeled so that the label can be read from the front, the jars are then removed, and oil, turpentine, or alcohol (as required) is poured into them.

To hang jar and brush in lid, first push the end of the brush handle up through slots in the rubber, and then screw the jar into place. Pull the brush handle through just far enough to prevent its resting on the bristles,

as shown. The rubber disks will hold it in place. To remove brush for using, unscrew jar with the right hand and simultaneously push brush handle down through hole with forefinger of left hand.

TEACHING CERAMICS IN A 20-SQ. FT. SPACE

Donald G. Brossman,
Wellington C. Mepham High School,
Bellmore, New York

One of the newest additions to the family of activities included in industrial arts is ceramics. Basing any arguments in favor of teaching ceramics on the number of contacts every person has with ceramic products every day, there should be no opposition to this activity. And yet many industrial-arts instructors and school administrators either overlook its possibilities or refuse to acknowledge them simply because of the lack of funds or adequate space.

Let it be understood that a ceramic unit capable of accommodating the comprehensive general shop requirements in a school of 1,200 students, can be set up very satisfactorily in 20 sq. ft. of floor space at a cost of less than $125. This price includes the cost of an electric kiln with inside dimensions of 8 by 9 by 9 in. The unit described here, has been set up at this cost and has given excellent service during the past year.

Having but a small amount of space available for this new activity, the writer designed a workbench to conform to the space to be used and at the same time to permit the kiln to be incorporated into the bench itself. It might be well to say at the outset that this arrangement offers absolutely no fire hazard, because the kiln must obviously be well insulated to properly fire the pottery. At no time has there been the slightest danger of overheating any inflammable parts of the bench. This particular unit has twice passed state inspections without comment.

The framework of the bench is made of hard maple to be in harmony with the rest of the shop benches and cabinets. It was assembled entirely with mortise-and-tenon joints. The top is made of 2-in. spruce, doweled and glued up to the required width, covered with 22-gauge galvanized iron to give a smooth work surface, and at the same time can be easily cleaned when the work is finished.

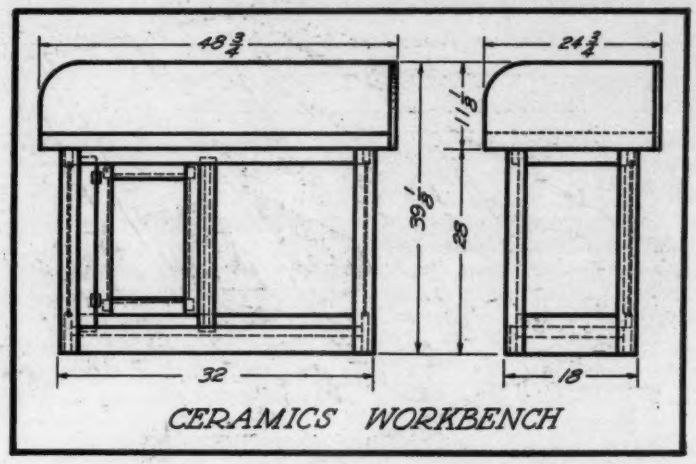
The paneling for the cabinet was made by ripping down ¾ in. hard maple and finishing it to a thickness of 5/16 in. Quarter inch plywood, faced with maple, would serve this purpose equally well. The door for the cabinet was assembled with haunched mortise-and-tenon joints and the panel inserted in grooves in the members of the door. A small knob, turned on the lathe in the shop, and a wardrobe lock were added to finish off the cabinet part of the bench. One shelf was built into this cabinet although a second one could easily be added if desired. While this cabinet beneath the workbench is not extremely large, it offers sufficient space for storing several plaster-of-paris molds for slip casting, several pounds of glazes and underglaze colors, pyrometric cones, and numerous other pieces of equipment and tools. Inasmuch as paneling around the kiln would serve no useful purpose, it has been omitted from this end of the bench.

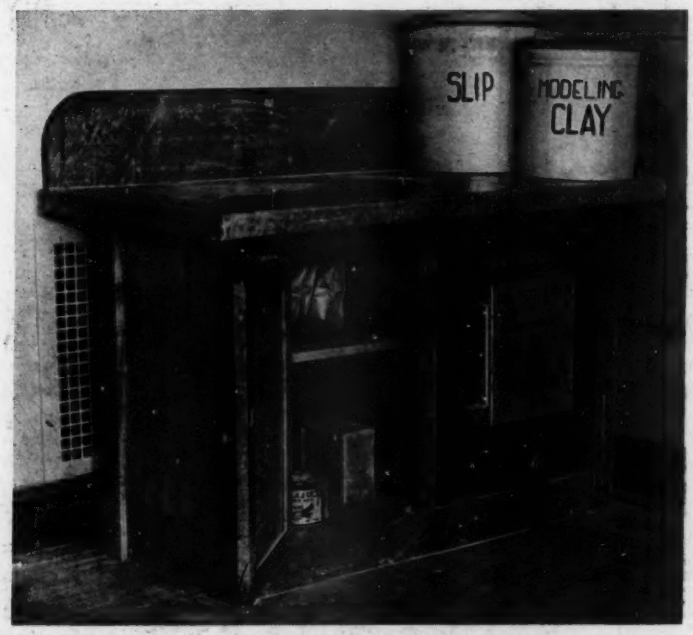
It will be noted that the lower rail of the bench extends completely to the floor, in this way preventing the collection of dust and dirt under the bench.

In this particular shop the clay is purchased in the dry form and mixed as it is needed. The clay flour is stored in large metal containers obtained from the school cafeteria. The clay prepared for modeling and slip casting is stored in earthenware crocks, as shown. Wooden covers should be made to keep out dust, dirt, and other foreign substances. Even with the closed containers, modeling clay should be kept covered with a damp cloth when not in use. If this is done the clay will remain soft and plastic indefinitely.

This unit permits two boys to work at one time in a relatively small space with all necessary material stored within the unit itself. With the small sized kiln close at hand, the students can *stack* the kiln and watch the progress of the firing process through the peephole. This is not usually possible where large kilns are used, thus necessitating the instructor's doing the firing after school hours. Often it is necessary to keep such a kiln in a separate room some distance from the shop. The firing is one of the most fascinating parts of the work and one that the students should certainly be permitted to observe in its various stages.

The addition of a unit such as this permits the carrying out of a most interesting new shop activity and at the same time offers a pleasing appearance to a previously unused corner of the shop.





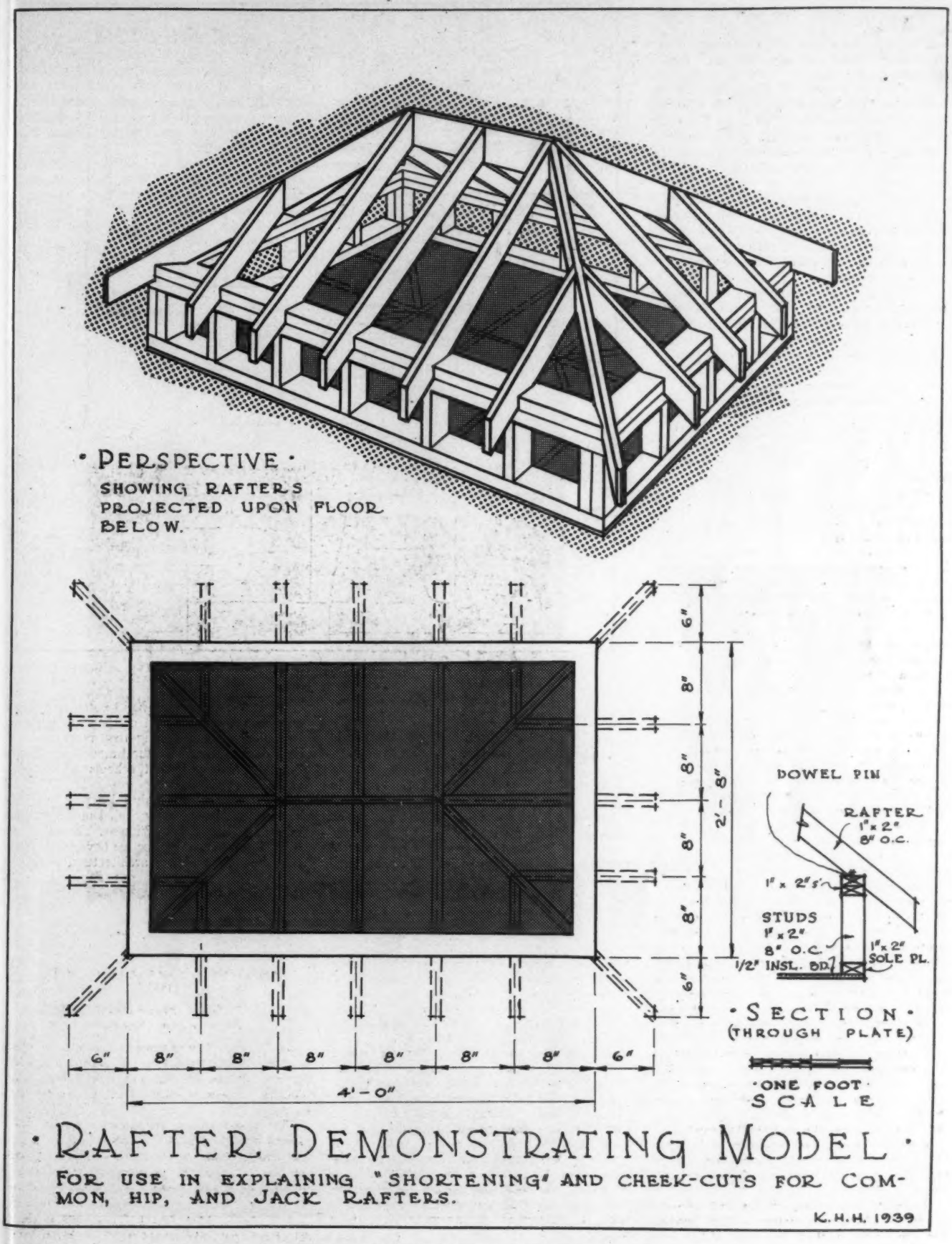
Arrangement of ceramic equipment

RAFTER DEMONSTRATION MODEL

Keith Hinchcliff,
Fayetteville, Arkansas

Due to the two-dimensional limits of the blackboard, the intricacies of shortening and marking off cuts for hip and jack rafters is a problem sometimes hard to get across to the student.

The model shown perspectively, with the rafters projected upon the floor below, helps the student visualize the rafters in place from the plan on paper. By pointing out the method of making all *shortenings* and measurements for cheek cuts in a horizontal plane, parallel to and exactly equal to the dimensions as they appear on the plan, understanding as to *why*



Rafter demonstration model by Keith Hinchcliff

things are done is substituted for merely learned rules.

The model, as illustrated, uses pieces which are about one-half ordinary size, i.e., 1 by 2's represent 2 by 4's for rafters, studs, and plates; and ½ by 3 in. is a good size for the ridge pole. The rafters are spaced 8 in. on center. This is about half of a good average spacing. Of course, the height of the stud-wall framing can be the minimum necessary for the overhanging rafters to be clear. Any desired pitch may be used.

Cutting a pair of rafters at a given pitch can be worked into a worth-while exercise. Each rafter allows the student to *step off* one step and part of another with his square, involving all the operations necessary for laying out longer rafters.

The rafters may be doweled together and to the ridge pole to make a self-supporting framework easily taken apart and analyzed.

BENCH STOOL

C. W. Mikulasek,
Santa Barbara State College,
Santa Barbara, California

The stool described and shown herewith is one of two dozen recently built at this institution under the direction of Mr. F. L. Griffin, instructor in woodworking.

This type of stool is very sturdy, serviceable, and economical. It was originally built for the jewelry and art-metal classes, but is being used also for classes in sheet metal and bench woodwork.

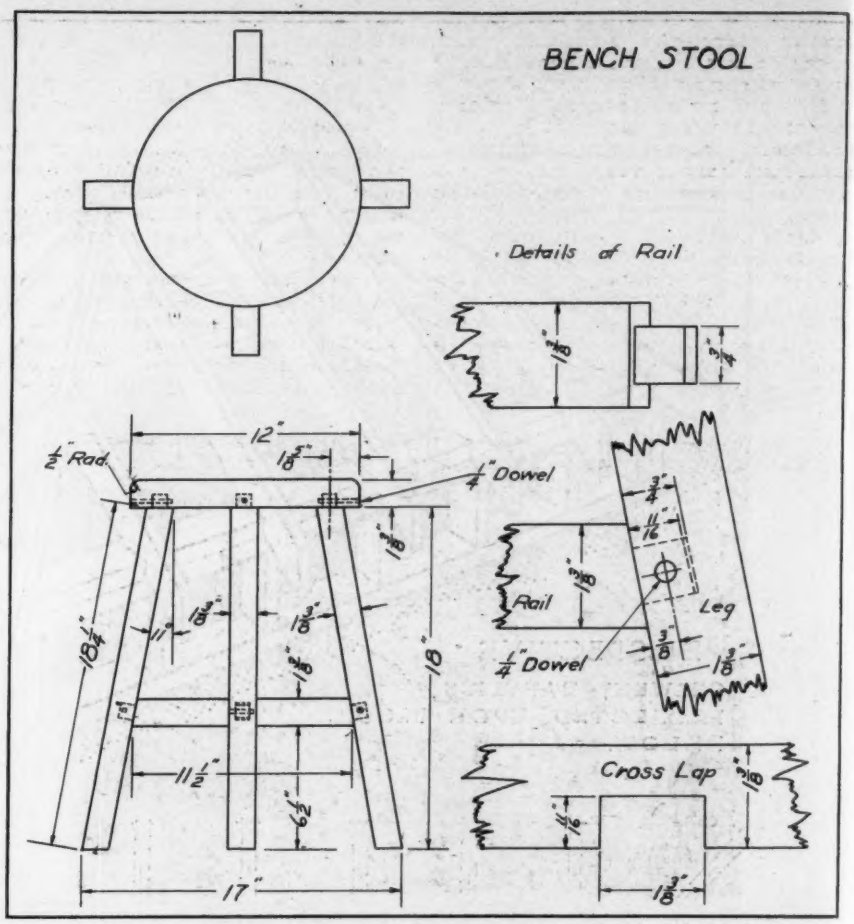
A sturdy bench stool

Using this type of construction, the stool can be made of almost any kind of wood. In this case birch was used. One suggestive and helpful step in the making of the stool is to construct a right triangular jig, whose hypotenus is 11 degrees to the base line (check with drawing). Using this jig upright and on its side, the tenons can be cut on the tenoning machine or table saw.

Be sure to make half of the crossbar tenons in one direction with respect to the lap cut and the others in the opposite direction. Make the tenons on the legs in the same manner — using the jig.

The ¼-in. dowel pins in all the mortise-and-tenon joints and the wood screw in the lap joint will insure sturdiness and long life.

The birch stools were finished with three coats of varnish, each being sanded with No. 6/0 abrasive paper, the last one being rubbed with pumice stone. Then two coats of wax were applied.



Details of bench stool

ARCHITECTURAL MODELS

G. A. Jester, Architectural Drafting Instructor, Milwaukee Vocational School, Milwaukee, Wisconsin

Within the past few years hobby work has taken the country by storm. The shorter workday has meant more leisure for many, and model planes, model boats, and model railroads are having their inning. So popular has this work become that social centers, especially in our larger cities, have had to offer it. Schools have also made it a part of their curriculums. However, it is surprising that more has not been done with architectural models, especially in vocational and high schools which offer architectural work.

Many schools of higher learning teaching architecture have now included model making as a part of their curriculums. The plan, the elevation, and the perspective have, heretofore, told the story as far as architectural work was

Fig. 1. Cardboard model of a Cape Cod home

concerned. But today with the newer and less familiar contemporary architectural forms, models are used as a supplementary mode of visual confirmation of the story. There is really a need for three-dimensional visualization through models. Some of the leading architectural schools of this country are installing well-equipped model shops and including model making along with their drawing courses.

Models may be said to come under three general classifications. These are: (1) those made of clay or plastelline, (2) those made of cardboard, and (3) those made of wood. Plastic material is ordinarily used by architects in their preliminary study of masses and detail. The professional model maker makes a wide use of this material.

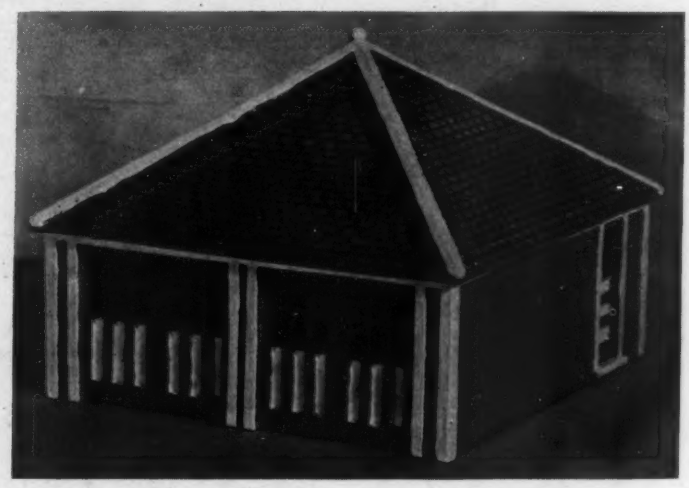


Fig. 2. Balsa wood model of two-car garage

Models of wood are more durable than those made of cardboard but they also require the use of power woodworking machinery.

Cardboard models have the advantage that they can be made with ordinary drafting-room equipment, plus a razor blade (the single-blade type with a reinforced back), a straightedge, and rubber cement for assembly work. Rubber cement works much better than paste because the material sets in a few seconds and is not smeary to work with. Little care need be taken in its application since the surplus can easily be rubbed off with the fingers or with art gum.

It is possible to obtain a model in wood of a small home for possibly forty or fifty dollars. Of course, the elaborateness of the model has much to do with the cost. Many complex models run into hundreds of dollars. The beginner will probably find that cardboard and balsa wood are the best mediums with which to work.

A model should be complete in every detail. that is, it should look like the building it is supposed to represent and not like a toy to be played with. The lay mind cannot in most instances read the full meaning of plans and elevations, but a model will help him comprehend the entire scheme quite readily. Students in architectural classes can make models of house plans quite inexpensively.

Illustration board can be used to good advantage in model work. The floor plan can be laid out, then cut on the inner wall lines and each room laid out with all walls, doors, windows, etc., exactly as each room will look when finished. The whole project can be set in a box which will be as deep as the rooms are high. Linoleum and carpeting can be used for the floors. Illustration board has the advantage that it will readily take water color.

Professional model makers ordinarily specialize in one basic material — cardboard, plaster, wood, clay, or plastelline. They have found by experience that models composed of several different materials are likely to warp and crack due to differences in expansion and contraction.

Basswood, patternmaker's pine, and white wood are excellent materials for model work as they can be cut and carved easily and are obtainable from any lumber dealer. Balsa wood is an easily worked wood but it is brittle and is easily damaged. Due to its open texture it does not take a very good finish. This can probably be noted from a careful observance of Figure 2.

The professional model maker uses small map pins on a 200 scale model (200 feet = 1 inch) to represent brushes. They are dipped in muscilage and then dusted with various colored ground felts. For larger scaled models a rubber bath sponge works satisfactorily. It should be colored with a water base paint. Select the color desired and dip the sponge into a thick solution of the paint, after which it should be squeezed between the fingers to force the color into all the crevices of the sponge.

Metal trees can be made from heavy picture wire or armature wire, one end being twisted tightly and the other end raveled. The loose ends should be united in the manner in which a tree would grow. Fine steel wool should then be added in several pieces to represent foliage clusters. The foliage should then be trimmed with shears, sprayed with muscilage, and dusted with sawdust. The trees should then be sprayed with green paint and the trunks brushed with brown.

Here are a few suggestions for beginners in model work:

For windows — Cellophane, celluloid, or vellum tracing paper.

For grass — Green paint and mixture of sand.

Evergreens — Steel wool textured with farina dusted over glue.

Hedges — Green rubber sponge.

Brushes — Small pieces of rubber sponge.

Trees — Steel wool over armature wire.

Stucco — Sandpaper sprayed with air brush to give proper color.

Sidewalks — Sandpaper (very fine).

The Cape Cod home shown in Figures 1 and 3 is a cardboard model laid out to the scale of ¼ in. to the foot. The material used for the brick, the siding, the shingles, the windows, and the doors can be purchased in sheets already printed. A kit costs $1.50 and one will find enough material in this kit to design two houses. Rubber cement is used to paste or cement the printed material to the cardboard backing. Cement is not supplied with the kit but can be purchased at any stationers. Sufficient cardboard for all backing material is supplied with the kit. Your local hobby-shop dealer can probably supply you with the kit or let you know where it may be obtained if he does not carry it in stock.

The writer used No. 3/0 sandpaper for the stoop and for the walks and driveway on this particular model. A 10-cent rubber sponge (green in color) from the 5 and 10 cent store made the trees and the hedge. Green cardboard which came with the kit was used for the lawn and the house was cemented directly to this.

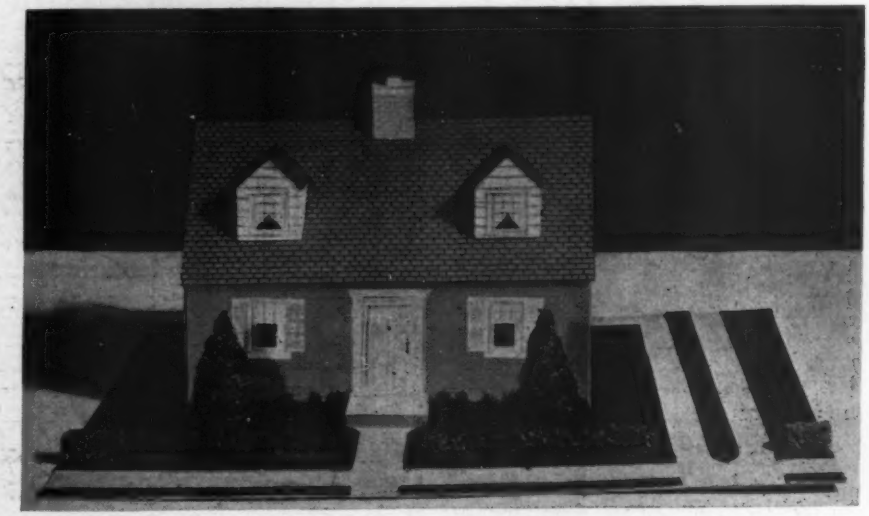


Fig. 3. Front elevation, Cape Code home

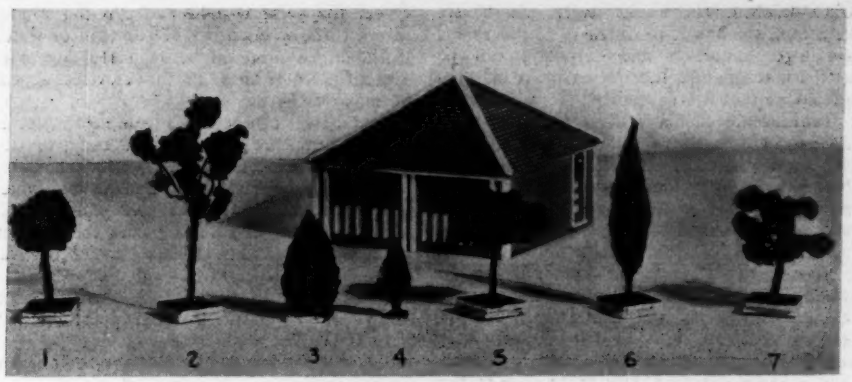


Fig. 4. Various types of trees

The impression should not be conveyed that all one has to do is to buy a kit and then cut out the patterns and the job is done. That, certainly, is not the case. One has to work out his *own* design carefully to scale and then use doors and windows and brick or siding to conform with a definite architectural style. For example, the windows in the material that is supplied in this kit all come with outside casings attached. It is needless to say that this must be carefully cut away when used in a brick wall and stone sills, either slip or lug, must be made and cemented in the proper place. Windows and doors must, as a general rule, line up properly at the top.

A Chicago firm now produces ¼-, ½-, and 1-in. scale plywood wall and roofing material, inside and outside trim, and such accessories as gutters, windows, doors, etc. Miniature lumber can be obtained in the following sizes: 1 by 4, 1 by 6, 2 by 2, 2 by 4, 2 by 6, 2 by 8, 2 by 12, 4 by 4, 4 by 8, 6 by 6, 8 by 8, 4 by 12, and 12 by 12 in. Hobby dealers will furnish you with circulars and prices.

Figure 4 shows a number of trees which were set on wooden bases for convenience in photographing. Reading from left to right the following materials were used: (1) Dupont sponge, (2) armature wire twisted tightly together for the trunk and raveled for the branches, with rubber sponge for the foliage, (3) Dupont sponge whittled into shape with a razor blade, (4) ordinary sponge, (5), (6), and (7) steel wool with armature wire for the tree trunks.

It is suggested that these various materials be purchased and that experiments be made with each. The trees, used in model work, should fit the locality in which the house is to be placed. The architectural-drawing instructor will find that he can stimulate interest in his work by introducing model work. He will also find that this can be done without making any necessary demands on his budget allotment.

ELECTRICAL TEST AND DEMONSTRATION BOARD

Clifford L. Yard, *Instructor*
Industrial Arts Department,
Junior-Senior High School,
Hastings-on-Hudson, New York

A useful adjunct to the equipment in the electrical shop.

This electrical test and demonstration board was developed to reduce the time consumed in routine wiring up of equipment in preparation for experimentation and demonstrations. The materials used for the board are regular shop equipment and the plan is presented as suggestive and may be modified to meet individual needs. The fact that a member of our first-year electricity course brought in a defective motor and was able to test it for ground, and test the armature coil and the field coil in ten minutes is sufficient evidence of the practicality of such a test board in the school shop.

It should be understood that this test board is not designed to solve *all* the problems of the electrical shop, neither is it intended to replace the ordinary individual or group equipment and the work accomplished therewith. It will however, conserve the time required for giving demonstrations, and make it possible to accomplish more during a given period of time.

Another value gained by the use of this

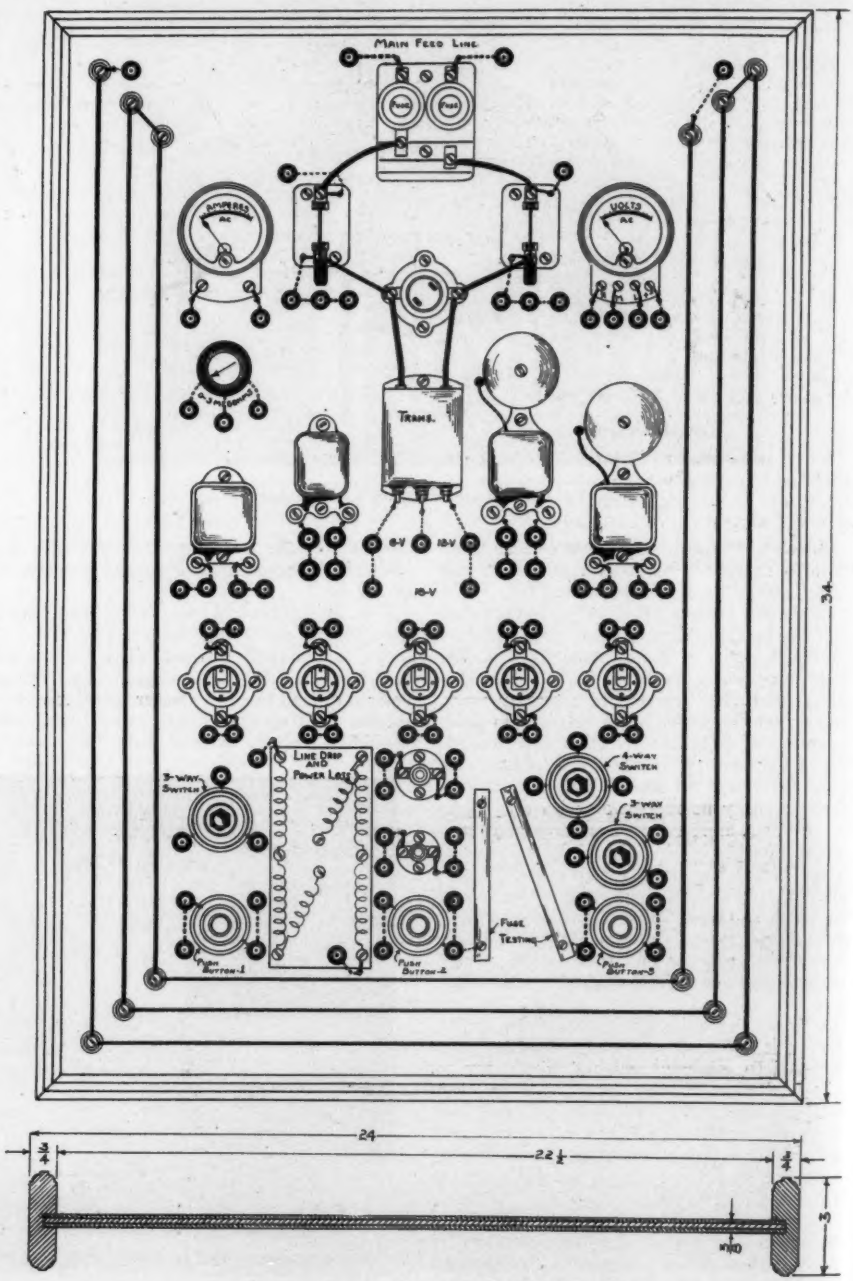


Fig. 1. Electrical test and demonstration board

test board is the experience provided in making *selection* of the proper contacts for any given job. This is in line with the ever increasing use of multiple-purpose testing instruments.

List of Materials

1 pc. ⅜ by 23 by 33-in. fir plywood
1 pc. ¾ by 3 in. by 10-ft. white pine
1 Two-plug cutout or a double pole main line switch
1 Ammeter, a.c., 0–30 ampere
1 Voltmeter, a.c., triple range, 0–150 volts
2 Knife switches, s.p., s.t.
6 Porcelain receptacles
2 Miniature receptacles
1 Variable resistor, 3 meg.
2 Doorbells
2 Buzzers
1 Transformer, 6, 12, and 18 volt secondaries
3 Push buttons
2 Three-way snap switches
1 Four-way snap switch
1 pc. ¼ by 3 by 8-in. transite board, or asbestos board
1 500-watt heating element
2 pc. ⅜ by ⅜ by 7-in. brass rods
12 ¾ in. stand-off insulators, 8–32 tap both ends
12 No. 6–32 by 1-in. machine bolts, r.h. brass
12 No. 6–32 hexagonal brass nuts
24 No. 8–32 by ½-in. wrought-iron machine screws
4 pc. ¼-in. fiber tubing, ⅞-in. i.d., ⅛-in. wall
96 Phone jacks, standard
22 Phone jack tips, standard
2 Alligator clips with rubber insulators
2 Battery clips
6 Clothespins, spring type
96 Fiber washers, ¼-in. i.d., ½-in. o.d.
40 ft. No. 18 flexible insulated wire
10 ft. No. 14 or No. 18 fixture wire
10 15 ft. Austin type *SJ* constant service cord
1 Plug cap, soft rubber handle

Construction

The illustrations, in Figures 1 and 2 are sufficiently self-explanatory that a lengthy description is not necessary. However, the following suggestions might prove helpful.

After the test board proper has been framed and the holes drilled it is well to insulate it with two or three coats of lacquer or shellac.

Two jacks are wired to each terminal of most of the pieces mounted on the board so that both series and parallel connections may be made. The solid lines shown in the wiring diagram in Figure 1, represent wiring on the front and the dotted lines represent the wiring on the back. Lines are painted on the front to clearly trace the wiring done on the back.

The details in Figure 2 indicate how to make the various types of plug-in connectors. It is important that care be taken to make the various connectors of each set the same length so that they may be held securely by the modified spring clothespins which are mounted along the sides of the back of the board. Two pairs of these clothespin clips hold the twelve 32-in. connectors, and one pair holds the six 14-in. connectors. The clothespins should be made of hard maple or birch.

The grips for the jack tips were made by fastening lengths of ½-in. round rod of modern plastics in a Jacob's chuck and turning or filing them to shape on a regular woodturning lathe. They should be well sanded with fine sandpaper and polished to give them a finished appearance. Short lengths of rubber tubing commonly used for windshield wipers serve the same purpose though they are not as attractive nor as permanent.

Some of the Practical Uses for the Test Board Outlined

1. Bell Wiring

a) Simple bell circuit.
b) Two-bell system.
c) Bungalow bell system.
d) Duplex bell system.
e) Street-car bell-signal system.
f) Light controlled from two and three places.

2. Series and Parallel Circuits

Testing and demonstrating the relationship between current, resistance and voltage in both series and parallel circuits.

3. Testing the Resistance of Conductors

Twenty feet of wire are accommodated by the series of stand-off insulators around the edge of the test board. This could be doubled by installing more stand-off insulators and by placing them more closely together. This is much more convenient and safer than to string such a length of wire around the room.

The relationship of the resistance of a conductor to its length, cross-sectional area (circular mils), temperature, and material can be easily and quickly tested on this test board.

4. Demonstrate Line Drop and Power Loss

The voltmeter, ammeter, and resistance unit (heating element) is quickly connected to demonstrate line drop and power loss. For an excellent detailed description of this refer to Parsons, G. Lewis: "Apparatus for Demonstrating Line-Drop and Power Loss Problems," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, 28:79–80, February, 1939.

5. Testing Household Appliances

Household appliances may be tested for continuity by using a lamp and for electrical-energy consumption by using the ammeter and voltmeter.

6. Regulate Current for Electroplating

The rheostat and meters come into play to regulate current for electroplating.

7. Testing Fuses

Both plug-in and cartridge fuses may be tested.

8. Motor Testing

Test line from source to switch.
Test switch.
Test line from switch to motor parts.
Test for ground.
Test armature coils.
Test field coils.

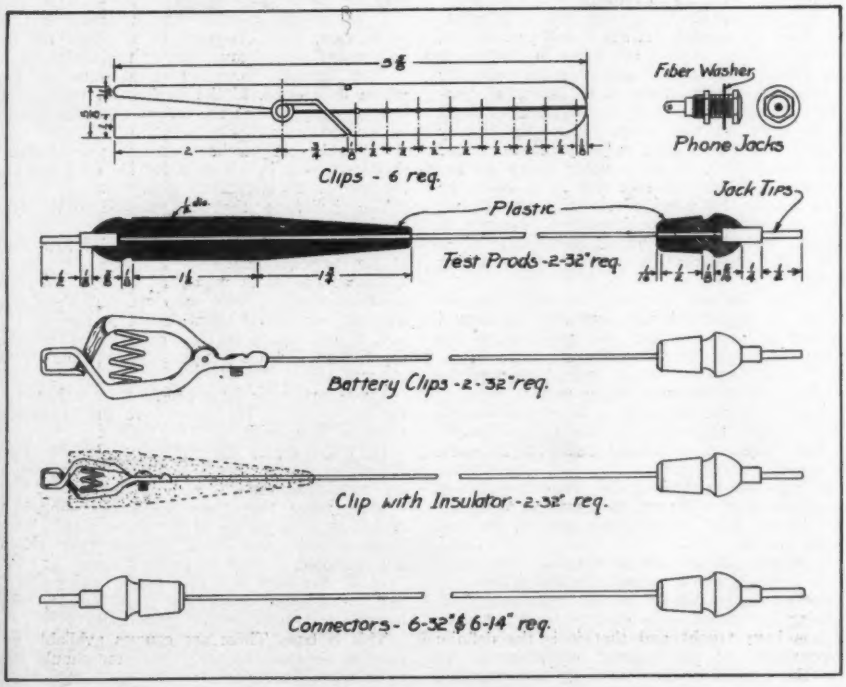


Fig. 2. Details of test connectors

PRINTING TEACHERS GIVE VIEWS IN SYMPOSIA

R. Randolph Karch, Principal,
Printing High School,
Cincinnati, Ohio

Representative printing instructors met at the nineteenth annual conference on printing education in Rochester, N. Y., for four days last summer to discuss their mutual problems. Held at the Rochester Athenaeum and Mechanics Institute, and sponsored by the National Graphic Arts Education Association, this conference was held on the clinical or symposia plan.

Whether or not we can agree on the findings of this group, we must respect the opinions of 206 printing teachers and others interested in printing education. These men, representing the teachers from 46 cities and 15 states and Canada, answered pertinent questions concerning their work in three levels of printing education: junior, senior, and vocational high school. Symposia groups met to answer questions on layout, composition, presswork, and related subjects.

Stenographers in attendance at each of the 12 meetings took notes on the findings, and these answers to the many questions are given herewith. Here, at least, are reported for the first time answers to questions which have puzzled many teachers for many years. One fact was brought out: that a definite and comprehensive study should be made of objectives at all levels of printing education. Likewise, some unity of thought is vitally needed among the brethren of the stick and the press.

A perusal of the following report will acquaint the reader with the many things

which beset the printing teacher in his work, and some suggestions for the improvement of teaching. It was generally agreed that the printing of school forms and stationery should not be done in the junior high schools and senior high schools, and that if done in the vocational schools, the teacher should be the judge of the amount of work and be allowed to set the time limits of such production himself. There is a cry for more practical courses, especially on the graduate level, to help the teacher in service to do a better job — these suggestions include laboratory courses in graduate work. As one report brings out, the teachers themselves note that their printed work is not up to trade standard in quality, and that the teacher-training courses should heed the call for courses of this type.

In the following data, some questions were omitted by the chairmen of each session. This report should not be construed that all men present agreed on the findings. On highly controversial questions a vote was taken, and the majority vote ruled in the answers.

Layout Symposium for Junior High Schools

Chairmen: Anthony Marinaccio and Murray D. Lynds

Before questions were discussed, an attempt was made to agree on a definite program of graphic arts for our junior high schools. The group wishes to go on record as stating that in the junior high school the traditional course in printing should be enlarged in scope in order that it may take in the richer field of graphic arts, so that our philosophy of general education may be justified. The following outline may serve as a major breakdown or suggestion for the course in junior-high-school graphic arts:

1. Letterpress Printing
2. Intaglio Printing
   - *a*) Etching
   - *b*) Engraving
   - *c*) Dry point
3. Planography
   - *a*) Stone lithography
   - *b*) Offset lithography
   - *c*) Collotype
4. Relief Platemaking
   - *a*) Line engraving
   - *b*) Linoleum blocks
   - *c*) Wood engraving
   - *d*) Wood cuts
   - *e*) Half tones and rubber plates
5. Papermaking
6. Inkmaking
7. Bookbinding
8. Miscellaneous Processes
   - *a*) Silk screen *b*) Duplicating

1. To what extent should layout be taught? Is layout instruction necessary, apart from shopwork?

Only the elements of layout should be taught according to the boy's needs.

2. Is it feasible to try to tie up layout with the art department or the mechanical drawing class?

It is feasible to try to tie up layout in a simple way with mechanical drawing and perhaps with the art department. We feel in doing it the work would not only be enriched by the mechanical drawing program, but would give it meaning. Some discrimination as to whether or not there is any value derived from the work done in mechanical drawing or art in terms of what we can do in the print shop.

3. What can the instructor do to improve the design of his shop printing?

He can exchange ideas with other instructors throughout the country. He can place good printing on bulletin boards. He can display instructional aids.

4. What instructional material is available, and what is needed for teaching layout?

Printed layout sheets; dummy layout sheets; old advertising service sheets from newspapers; drawing equipment: T square, line gauge, brass rule; necessary materials for sketching and drawing; simple instruction sheets; blackboard and plenty of chalk.

5. Should the layout instructor consider a formal art training as a prerequisite for his job?

No, but he would distinctly profit by a layout course in commercial design.

6. Where the teacher has a great deal of production, how can layouts be made for the betterment of the education of the students?

All production work should be left to the discretion of the instructor. There should be no time limits attached to it, and the instructor should be the one to decide whether or not it fits into his program of education, and whether or not it meets the needs of the pupils that he has in the classroom.

The name of the course ought to be enlarged to enhance the richer scope of graphic arts and our work ought to be labeled "laboratory" rather than "print shop" because the term "laboratory" is more consistent with the term of education. Instead of the labels on our doors reading "print shop" they should read "graphic-arts laboratory."

The graphic-arts laboratory should be considered as part of the entire program of general education and not as a service course. Our contribution to general education is one of orientation, one of exploration, and one of guidance in the graphic arts, and of practicing certain social traits in the laboratory setup.

7. Should the teacher prepare type specimen sheets of faces in his shop for his own use and the use of his students?

No — the students should prepare them.

8. What type faces should be added to a shop at the present time?

This depends on the situation each instructor is in and what he already has. The type faces ought to be secured in type families rather than in individual sizes and we should have a variety of representative faces in order to introduce typography in its true sense.

9. If one wants to lay out a new printing department what type faces should be recommended?

(See No. 8.)

10. What should the student be taught about the duties of the layout man, his salary, working conditions, etc.?

The student ought to be given information concerning various conditions of the workers, their wages, etc., in all phases of graphic arts.

11. It has been said that school printing is of low typographic quality. If this is true, what can the instructor do to improve it?

This may pertain to a trade course in printing where the specific need is a well-printed job. Our interests in general education in the junior high school is in terms of educating the youngster to become a better citizen in an industrial democratic society. This means that our results ought to be evaluated and judged in terms of any changes which take place in the youngster rather than the quality of the printing which he has produced. While our objective is to have the pupil develop his grasp of the graphic arts, we must emphasize good workmanship as much as possible, and also good habits of work.

12. Can standards be set up for teaching layout?

We feel, on our level, no standards can be set up for teaching layout, but that we should attempt to meet the needs and problems of the pupils whenever and wherever they arise. However, definite standards of evaluation may be set up to judge the work of the pupils.

13. How should students be scheduled for this work? Should the course be concentrated in one or two semesters, or spread out over a period of several years?

We have agreed that in the junior high school there should be no course in layout as such, but that layout work should be a part of the rest of the course.

14. What can the teacher-training institution do to help teachers of printing in this area?

The young teacher graduating from a teacher-training institution is inclined to teach what he he has been taught and that it is the definite responsibility of the training institution to see that the student teachers have an understanding of the philosophy behind the work and also of the skills in the various phases of graphic arts. Also, that he has a knowledge of layout in all these areas, so that when the student teacher graduates and goes out on the job, he has a definite understanding of the needs and also of the ramifications of graphic arts, and that he can teach a suitable course in the junior high school.

We feel that these same teacher-training institutions ought to have a program of courses for teachers in service, so that the latter may go to the teacher-training institute to receive aid in certain phases of graphic arts on which they are not competent.

The teacher-training institutions ought to provide practical courses in the realm of the graphic arts on a graduate level, so that teachers can secure credit for them toward advanced degrees.

15. Is supervision of layout teachers on a high plane? Is undue difficulty had with scheduling, getting adequate supplies, production, etc.?

It is insofar as a definite course in layout is concerned, but we feel that we are not getting adequate supervision for graphic arts.

Layout Symposium for Senior High Schools

Chairmen: Floyd C. Larson and James W. Loop

1. To what extent should layout be taught? Is layout instruction necessary, apart from shopwork?

There is a definite need for layout instruction and it should be carried on to the extent of making a layout for the benefit of the printer and the compositor.

2. Is it feasible to try to tie up layout with the art department or the mechanical-drawing class?

There is no conscious tie-up, but there is a relationship.

3. What can the instructor do to improve the design of his shop printing?

The instructor can first learn layout and get some experience in the printing business.

4. What instructional material is available, and what is needed for teaching layout?

A great deal of instructional material is available in the summer courses in colleges. There are adequate texts and working materials for teaching layout.

5. Should the layout instructor consider a formal art training as a prerequisite for his job?

It is a good thing to have but is not essential. The printer's mind may go off on a tangent. He may go "arty."

6. Where the teacher has a great deal of production, how can layouts be made for the betterment of the education of the students?

That depends upon the local situation and where it is done. If the production work came in soon enough, then the layout education should be worked with production.

7. Should the teacher prepare type specimen sheets of faces in his shop for his own use and the use of his students?

The belief is that we should have type specimen sheets.

8. What type faces should be added to a shop at the present time?

Those type faces which fit in best with the production of the print shop and something that will last for several years should be added.

9. If one wants to lay out a new printing department, what type faces should be recommend?

Traditional type faces should form a basis for the entire plant. We must have the traditional types to start with.

10. What should the student be taught about the duties of the layout man, his salary, working conditions, etc.?

Most agree that trade economics should be taught to some extent in the senior high schools. Some teachers will teach it more than others, but it should at least be touched upon.

11. It has been said that school printing is of low typographic quality. If this is true, what can the instructor do to improve it?

This is true. There are courses available and summer sessions that the instructor should take to improve himself.

12. Can standards be set up for teaching layout?

Yes, standard objectives can be set up for teaching layout but standard methods of achieving such objectives cannot be set up.

13. How should students be scheduled for this work? Should the course be concentrated in one or two semesters, or spread out over a period of several years?

It should be spread out over a period of several years; but before doing so, you must start out with a definite unit study of printing design.

14. What can the teacher-training institutions do to help teachers of printing in this area?

They must have a layout specialist in the institution — one who knows how to teach layout.

15. Is supervision of layout teachers on a high plane? Is undue difficulty had with scheduling, getting adequate supplies, production, etc.?

Supervision is not on a high plane because the layout teachers are not prepared. You have got to raise the level of the layout teachers before a higher plane of supervision can be reached. There is a great deal of difficulty involved in getting adequate supplies, etc.

Layout Symposium for Vocational Schools

Chairman: Dwight Marsee

1. To what extent should layout be taught? Is layout instruction necessary, apart from shopwork?

Layout should be taught throughout the entire course. Start out on a small basis along with the students' practical experience and then if an art teacher is available, he could be depended upon to teach the design in printing. It was suggested that it might be advisable for the layout teacher to take some time off from the regular classwork to deal specifically with layout instruction. It was also suggested that it might be well to have a teacher training institution in which to train both art and publishing to printing teachers; that is, have one class for each group.

2. Is it feasible to try to tie up layout with the art department or the mechanical-drawing class?

It was decided that it is wise and feasible to tie up with the art department and the mechanical-drawing department but not entirely depend upon them. By tying up with either department, benefit could be gotten. It was suggested that it is a waste of time to give the students an entire year of mechanical-drawing work.

3. What can the instructor do to improve the design of his shop printing?

It would be desirable to make up a catalog list of all material available on different types of jobs and to use this material as instruction basis. Two systems mentioned were paper samples and scrapbooks.

4. What instructional material is available, and what is needed for teaching layout?

This was covered quite definitely in question 3 when it was suggested to set up a catalog list of all material available on different types of jobs.

5. Should the layout instructor consider a formal art training as a prerequisite for his job?

It is not necessary for the layout instructor to consider a formal art training a prerequisite for his job, but it is advisable that he have knowledge of the principles of design.

6. Where the teacher has a great deal of production, how can layouts be made for the betterment of the education of the students?

Just enough production should be carried to teach the students the fundamentals and then, after the fundamentals have been mastered, it will be possible for the students to secure speed.

7. Should the teacher prepare type specimen sheets of faces in his shop for his own use and the use of his students?

The teacher should prepare type specimen for use in the shop and also to include some system of copy fitting.

8. What type faces should be added to a shop at the present time?

It was suggested that those faces be added that are being used in industry and that would be used as a teaching device.

9. If one wants to lay out a new printing department what type faces should be recommend?

It would be necessary to determine what types were being used by other departments and buy accordingly. It would, of course, also depend on the financial status of the department and it would be necessary to make a very definite selection.

10. What should the student be taught about the duties of the layout man, his salary, working conditions, etc.?

It was stated that he would secure all of this knowledge through contact and observing conditions.

11. It has been said that school printing is of low typographic quality. If this is true, what can the instructor do to improve it?

The instructor can take a course in typography. The men from industry should know typography so that they will be able to teach it. When an instructor discovers a student doing something incorrectly, he should do something immediately to correct it.

12. Can standards be set up for teaching layout?

This statement was covered in previous discussion.

13. How should students be scheduled for this work? Should the course be concentrated in one or two semesters, or spread out over a period of several years?

It was decided that the lessons should be spread out for the entire course.

14. What can the teacher training institutions do to help teachers of printing layout?

It is possible for these institutions to teach printers how to teach. In one city printers are taught how to make layouts and make sketches on the blackboard. The teacher-training institutions should teach printers the fundamentals of what should be taught in layout. It was suggested that a course be built up for a small charge — a correspondence course.

15. Is supervision of layout teachers on a high plane? Is undue difficulty had with scheduling, getting adequate supplies, production, etc.?

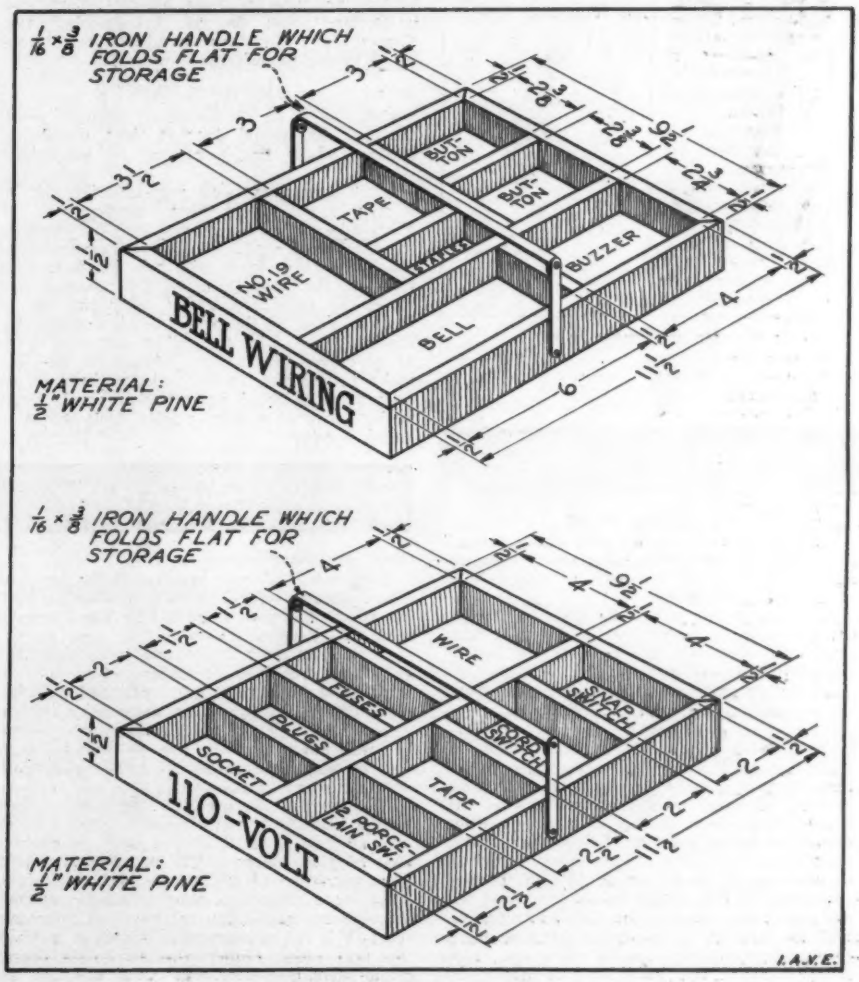
This question was not discussed.

WIRING KITS FOR THE STOCK ROOM

Russell J. Hunt,
New Baltimore, Michigan

If you teach high- and low-voltage electricity, you will find the kits described herewith a great convenience and a timesaver. We have two different sets of these boxes. One set contains all the material required for the bell wiring or low-voltage work, and the other set contains all the material which is required for 110-volt work.

These kits are a great timesaving device for both the student and the stock clerk. The stock clerk can quickly check them out at the opening of the period, and the student finds it convenient to receive the materials as a unit. He does not have to return to the stock room during the period for additional pieces of equipment, and when the clean-up bell rings he finds it a very simple matter to replace the material he must return to the stock room, where the stock clerk can quickly check it. The kits are stored on shelves where they occupy a minimum amount of room because the handles fold down against the boxes.



Details of kits for the electric shop

INDIAN FLAGEOLET

W. Ben Hunt
Hales Corners, Wis.

(For plates on Indian Flageolet, see page 336)

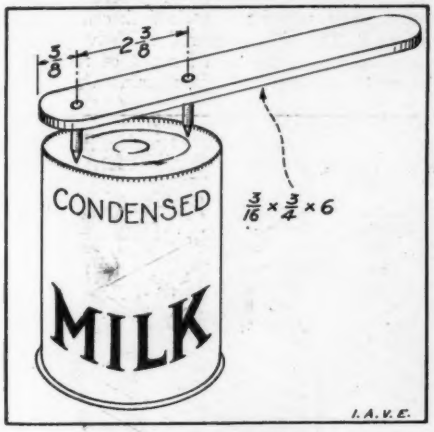
A few words of explanation might be added to the instructions already given on the plates describing the Indian flageolet.

The volume control, for instance, may be made of many different materials. It should be perfectly flat so that it fits well on the flattened surface of the flute and on the bottom of the block. This will prevent loss of air. It is best to tie the block in place with buckskin, as this gives a little so that some adjustment may be made. Be sure the lip is perfectly smooth and not too sharp.

If the tone is not clear, perhaps a thicker or thinner volume control will do the trick. On some flutes, the top is flattened where the finger holes are. When bamboo is used, it is well to tie it at several places to prevent splitting.

A piece of tubing with a ⅛-in. inside diameter is sometimes forced into the end of the wood for a mouthpiece.

Paint the flageolet with dull red paint. If desired, it may be further decorated with beaded bands.



Metal milk-can perforator

Submitted by
Clarence J. Swahn
Wilson Jr. High School,
Erie, Pa.

ANSWERS TO QUESTIONS

STAINING PINE

1071. Q.: I would like to have a stain formula for a knotty Ponderosa pine wall. If the same material is used on the ceiling, should it be stained the same shade?

A.: Knotty pine, either the white or Ponderosa type, can be properly finished by use of an asphaltum vase stain. Use:

Turpentine asphaltum	½ pt.
Pure turpentine	1½ pt.
Gasoline (no ethyl)	3 qts.
Batch	1 gallon

Color is controlled by using more or less asphaltum. Tone is affected by drying the stain coat at least 24 hours with heat, then sealing with orange and white shellac of the proportions desired to get a light or dark orange tone as one's tastes may dictate. Thin in the proportion of one part of mixed shellac to eight parts of denatured alcohol, shellac grade. Dry, sand with 6/0 garnet moistened on the back and repeat but with the addition of an equal volume of shellac-mixing lacquer added to the white and orange shellac mixture. Dry hard, sand as before, then make up a flat pad of No. 00 steel wool, load with yellow floor wax and cut down smooth. Final finish should be thin, soft in tone with only a trace of orange, and in dull to medium gloss. The whole effect should appear to be a part of the wood itself and not any varnished appearance at all. Polish wax with a piece of Body Brussels carpet if you can find such an antique in the family attic. Finish ceiling one third lighter than side walls.

STAINING YELLOW POPLAR

1072. Q.: Can you suggest any publication dealing in detail with the finishing of lumber, particularly yellow poplar?

A.: In regard to the finishing of poplar, you will find all the necessary instructions in my book, "Wood Finishing and Painting Made Easy," if you will apply the suggestions listed under "Wood Stains and Their Application." In other words, any finish which can be applied to basswood, maple, mahogany, or walnut can be successfully duplicated on poplar. While it is a close grained wood devoid of apparent pores, it will still respond to a filler coat applied over the dried and sanded sealer coat. A shellac-mixing lacquer or the newer "wood preservative finishes" are particularly adapted to this wood which will appreciably harden up under a good finish. — *Ralph Waring.*

BLEACHING BLACK WALNUT

1067. Q.: I have built a black-walnut coffee table which must be finished to match other furniture in the room which has been bleached to a lighter color than the natural. I have tried bleaching with oxalic acid with no results. What should I do?

A.: In order to get the commercial bleached effect you desire, it will be necessary for you to buy and use industrial bleaches. These can be secured from the M. L. Campbell Co., Kansas City, Mo. Observe all the precautions noted on the manufacturers directions.

LUMINOUS PAINT

1068. Q.: I am interested in luminous paint, the type that would shine at night. Could you tell me where this paint can be purchased? — *J. I.*

A.: The manufacturers representative, Mr. J. P. Lippitt, 10 Grand Blvd., Binghampton, N. Y., will be able to supply you with the luminous paint in small quantities through arrangements which have been made with him. Please be cautious in the application of this material and avoid the usual practice of using the lips to form a point on the artists brushes during the application of this material or industrial types of poisoning may result. Instead of the lips, make a small sheet metal pallette which can be hung over the thumb and which allows the brush to be drawn to a point readily while in use. — *Ralph Waring.*

NEW PUBLICATIONS

Tool Steel Simplified

By Frank R. Palmer, assistant to the president, The Carpenter Steel Co. Cloth, 311 pages, 6 by 9, illustrated. Price, $1. Published by The Carpenter Steel Co., Reading, Pa.

In this handbook, toolmakers and metallurgists will find a wealth of interesting and helpful facts about tool steels and their treatment. Although the author talks principally about the Carpenter "matched set" of tool steels and how they should be used and heat-treated, he has included much information that is applicable to tool-steel treating and testing in general.

The book is divided into five parts, each of which contains several chapters. Part I treats of tool steel, what it is, and what its chemical and physical characteristics are. Part II tells of the "matched set" method of selecting the right steel for a given application. Part III discusses heat-treating and testing methods and equipment. Part IV is full of practical information on design, hot acid testing, timber tests, spark tests, furnace atmosphere, quenching, and trouble shooting. The last part contains tables and an index. The book also contains several valuable heat-color charts.

How to Read Aircraft Blueprints

By Owens and Slingluff. Paper, 256 pages, plus many large-size folded-in blueprints, 9 by 11¼. Published by The John C. Winston Co., Philadelphia, Pa.

This very practical blueprint-reading course, specially developed for those who want to enter the aircraft field, is of special importance at this time when a step up in airplane production is so urgently demanded.

The material is divided into three parts, the first and second dealing with the general phases of drafting, while the third presents typical applications in the field of aeronautics.

The book contains quite a number of full-size blueprints taken directly from industry so that the student becomes acquainted with industrial working drawings and methods from the very beginning.

Motor's Factory Shop Manual

Cloth, 494 pages, 8¾ by 11¼, illustrated. Price, $3. Published by Motor, 572 Madison Ave., New York City.

Although designed primarily for use by the trade, this guidebook to automobile repairing may be used in the school shop as a reference source, having been compiled throughout from the official service manuals supplied by car manufacturers to their regular dealers. It omits theory almost entirely, but gives step-by-step procedure instructions for all overhaul and adjustment work on every model of car from 1934 to 1940 inclusive, with a separate chapter covering each make of car. Nineteen additional chapters are devoted to such units of general equipment as carburetors, generator controls, steering, brakes, shock absorbers, etc., while approximately 350 tables and charts provide all necessary specifications, clearances, and settings.

Turret Lathe Operator's Manual

By J. R. Longstreet and W. K. Bailey. Cloth, 240 pages, 7⅜ by 10¼, illustrated. Price, $2.50. Published by The Operator's Service Bureau of The Warner and Swasey Co., Cleveland, Ohio.

This authoritative text on the operation of the turret lathe will be welcomed by school and industry.

The material is divided into 25 chapters in which everything pertaining to the turret lathe is thoroughly covered. Chapter 1, which contains an historical review of this power tool, will be found to be very interesting.

Applied Mathematics for Girls

By Nettie Stewart Davis. Cloth, 274 pages, 5½ by 8½, illustrated. Price, $1.50. Published by The Bruce Publishing Co., Milwaukee, Wis.

This book aims to show the student how to apply arithmetic to the problems arising in the home and in the trades and industrial occupations open to women.

The book provides a review of the fundamental arithmetical operations and then shows their applications in problems pertaining to the trades, selling, pay rolls, time sheets, family budgets, foods, clothing, furnishing and decorating, taxes, insurance, banking, real estate, and the like.

The application of algebra and geometry also is shown.

Occupations

Prepared by the Department of Guidance and Secondary Education, Public Schools, Knoxville, Tenn. (Bound Copy) paper, 80 pages, 8½ by 10⅞.

The Department of Guidance and Secondary Education of the public schools of Knoxville, Tenn., have prepared upward of 80 wonderfully compact occupational information leaflets. These are issued weekly to the teachers of the Knoxville system for the use of the teachers. Bound copies of these leaflets also are available for the use of the teachers.

Some of the occupations covered are: Advertising, Mining Engineering, Social Service, Journalism, Careers in the Public Service, Photography, Chemistry, Banking, Commercial Art, Music, Mechanical Work, Teaching, Forestry, Welding, Diesel Engineering, Secretary, Electrical Engineering, Careers in Designing, Architecture, Occupations in the Business World, Vocations in the

(Continued on page 18A)

This Valuable SHOP LAYOUT BOOK is yours—*Free*

Contains Many Shop Photographs and Floor Layouts
Tells how to plan new shops and modernize old shops

Prepared by vocational instructors from all over the country—the shop layouts and photographs contained in this new book are authentic school shop installations embodying the most ingenious solutions of the problems of space, safety, lighting, convenience and teaching efficiency in both small and large schools. There are actual floor plans and photographs of 30 shops in this attractive 44 page book.

In addition, this new book for the first time makes available important information on the new type of industrial power tools that are being so rapidly adopted for school use. Each tool is listed individually—band saws, circular saws, lathes, jointers, grinders, drill presses, shapers, scroll saws—and separate instructions for the placing and most efficient use of each tool are given.

Every one interested in vocational instruction should have a copy—and it's yours—FREE—for the asking. Simply fill out the coupon and your copy will be sent postpaid, without obligating you in the slightest.

DELTA MANUFACTURING CO.
(INDUSTRIAL DIVISION)
600 E. VIENNA AVENUE
MILWAUKEE, WISCONSIN

Delta Manufacturing Company (Industrial Division) E10-40
600-634 E. Vienna Ave.
Milwaukee, Wis.

Please send me, without any obligation, a FREE copy of your new book "How to Plan a School Workshop"

Name .....
Address .....
School .....
City ..... State .....

Detroit Public Library

"BOY-PROOF" FEATURES MAKE THESE STANLEY HAND DRILLS Ideal For The School Shop

★ Chuck locked on spindle — opens to capacity and stops

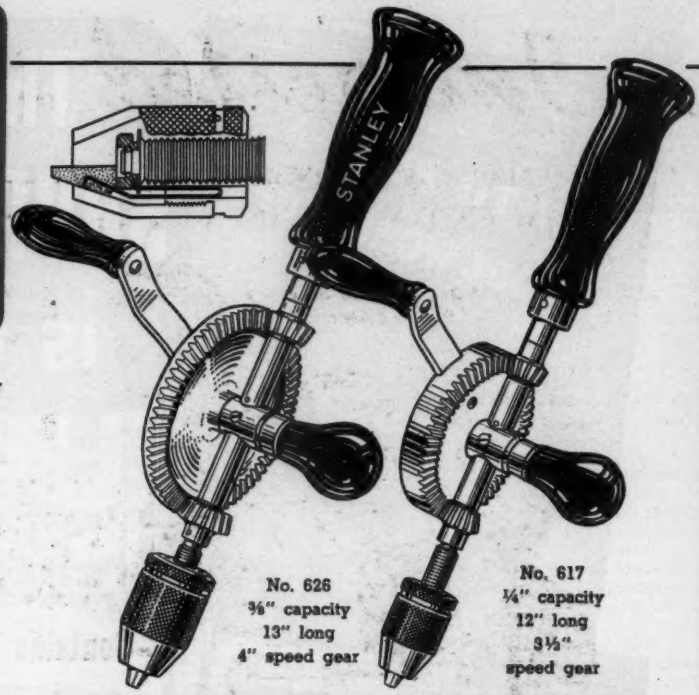
★ Protected jaw springs, hairpin design

★ All steel frame for light weight and strength

★ Machine cut gear and pinion teeth for easy operation

★ Heavy offset crank and full size handle

Built for rugged service in the school shop. Write for Stanley Catalog No. 34 and use it as a handy reference book.



No. 626
⅜" capacity
13" long
4" speed gear

No. 617
¼" capacity
12" long
3½"
speed gear

STANLEY TOOLS
Division of The Stanley Works
Educational Dept., New Britain, Conn.

(Continued from page 346)

Textile Industry, Police Officer, Postal Clerk and Letter Carrier, Electrician, Mechanical Drawing, Salesmanship, Science, Mathematics, Home Economics, English, Insurance, Nursing, Medicine, Civil Service Jobs, Law, Radio, Broadcasting, Personnel Director, Hobbies and Vocations, Jobs in Television, Accountant, Aviation Mechanic, Dentist, Engineering, Pharmacy as an Occupation, Library Profession, Credit, and Real Estate.

PERSONAL NEWS

♦ NELSON L. BURBANK was promoted to the principalship of the William Howard Taft School of the Cincinnati public schools in June, 1940. For four years he was an assistant principal of the George F. Sands School and for eleven years previous to this he taught drawing, mathematics, English, science, civics, and shopwork in the Building Vocational High School of the Cincinnati public schools.

Nelson L. Burbank

Graduating from Hughes High School, Cincinnati, he worked as a machinist, pipe fitter, carpenter, painter, clerk, and waiter during college days and vacation periods. He graduated from Miami University in 1923 with a two-year diploma and taught in Bellefontaine, Ohio, for one year, attended Ohio State for one year before coming to Cincinnati. In 1930–31 he was on leave, and through the aid of an assistant instructorship at Miami obtained the M.A. degree in Education.

He is the author of two books, "Carpentry and Joinery Work" and "House Construction Details" and has written numerous theses and magazine articles.

He has done graduate work in administration at Columbia, Chicago, and University of Cincinnati.

♦ STANLEY J. PAWELEK, head of the department of industrial arts at the State Teachers College, Winona, Minn., has been granted a leave of absence for the year 1940–41. He is attending the Pennsylvania State College, working toward a doctorate degree. He will also be part-time instructor in the industrial education department at that institution. He was guest professor in this department during the last summer session. Harry R. Jackson is acting head in Mr. Pawelek's absence. He is assisted by Hugh Capron, a member of the class of 1940 at Winona State Teachers College.

♦ JOHN PAUSTIAN, who was formerly on the faculty of the College of Education, University of Florida, has been appointed as a member of the staff of the Mechanical Engineering Dept., University of Nebraska, Lincoln, Nebr.

♦ J. I. BIEGELEISEN, author of "The Silk Screen Printing Process" and "The ABC of Lettering" will be in charge of a free evening course in freehand lettering and silk-screen stencil printing at the New York Evening School of Industrial Arts, at New York City, for the coming school year.

♦ ROY LANE, a graduate of the School of Printing at Kansas State Teachers College, Pittsburg, Kans., after a year of successful teaching in the Chanute City Schools, took a new job with the Masonic Home and School of Printing at Fort Worth, Tex.

♦ The following industrial-arts majors who were granted degrees at the State Teachers College, Newark, N. J., in June, 1939, were appointed to teaching positions at the communities listed herewith: Leroy Bohsen, Fred Christoffel, and John Cloves, Elizabeth, N. J.; Russell Heeren and George Bizlewicz, Jersey City, N. J.; Harvey Bowne, Nutley, N. J.; Lawrence Harris, Roselle Park, N. J.; Henry Holz, Union, N. J.; Louis Jacobus, Ramsey, N. J.; James Noble, Bloomfield, N. J.; Harper Pearce, Millville, N. J.; Emil Pelach, Leonardo, N. J.; and Charles Di Fazio, Gloucester, Va.

♦ E. E. Gallup, long-time state supervisor of vocational agriculture for Michigan, died in Lansing on August 1.

He served as state supervisor of vocational agriculture under the state board of control for vocational education from 1918 to 1937 and was supervisor of curriculum and research in agricultural education for the same department for two more years.

Previously Mr. Gallup had spent five years in each of the following positions: superintendent of schools at Monroe, Mich., principal of the Adrian high school, superintendent of schools at Chelsea, Mich., and superintendent at Hanover, Mich.

♦ Unfortunately, an error crept into the statement on page 304 of our September issue which announced Gordon O. Wilber's promotion at Oswego Normal School, Oswego, N. Y. Mr. Wilber's position at Ohio University, Athens, Ohio, during the summers of 1930 and 40 was that of lecturer, not head of the industrial-arts department. Professor Charles R. Kinnison is the regular chairman of that department and Professor F. Theodore Paige acted in that capacity during the past summer.

Interested in Boats?

Free plans by eminent naval architects make them easy to build from EXT-DFPA, the exterior type of Douglas Fir Plywood

"Gosh I could have fun in this sailboat!"
"It says to be sure and use only the exterior type of Plywood!"
"This 9-foot skiff looks good to me!"
"Let's build this knockabout together!"

This "Modern Miracle in Wood" simplifies and improves every student project!

● Douglas Fir Plywood has long been considered the *only* material for dozens of jobs. A new *only* —since the introduction of the outdoor type of plywood, EXT-DFPA —is small boats.

Naval architects and boatsmen all over the country soon found EXT-DFPA fully as waterproof as claimed—even after years of the hardest use and exposure to all kinds of conditions. They also found that the big panels minimized seams —bent easily—made their boats lighter as well as stronger—reduced their labor—and cost no more than the materials previously used.

Because of the great interest in plywood boat building, the Douglas Fir Plywood Association recently called on some of the nation's leading naval architects to design 5 types of boats that seemed most in demand. After the plans were completed, actual boats were built from them to make sure every detail was perfect. All the plans came through with flying colors and are now available without charge. Descriptions of them are below. To order, write Douglas Fir Plywood Association, Tacoma Bldg., Tacoma, Wash.

For Luxurious Living — tells how to finish Douglas Fir Plywood. A very useful booklet.
Grade Use Guide — gives detailed information about different grades of Douglas Fir Plywood.
Boat Plan No. 20 — 15-foot Knockabout. Complete plans, specifications and directions.
Boat Plan No. 21 — 20-foot sailboat. Designed by C. P. and E. D. Burgess. Plans, specifications and directions.

Boat Plan No. 22 — 11½-foot skiff designed by Edwin Monk, N.A. Plans, specifications and directions.
Boat Plan No. 23 — 9-foot skiff, designed by Edwin Monk, N.A. Easy to build, light in weight, sturdy, inexpensive. Plans, specifications and directions.
Boat Plan No. 24 — 8-foot pram-dinghy, designed by C. P. Burgess. Can be carried easily. Plans, specifications and directions.

● Be sure to build your boat only of plywood that bears the "grade trademark" EXT-DFPA on the edge of the panel. Look for these "grade trade-marks" on the Douglas Fir Plywood you use for other projects, too. They are positive, instant identifications and tell the specific jobs for which each panel was made.

There's a grade for every use!

PLYPANEL The grade of Douglas Fir Plywood for fine cabinet work, cut-outs, paneling — every project where both sides of the plywood are to be finished and exposed to view.

PLYWALL The wallboard grade of Douglas Fir Plywood. Use it for display cut-outs, backs of cabinets, light shelves, partitions, etc., where only one surface must be perfect. Builds puncture-proof walls and ceilings.

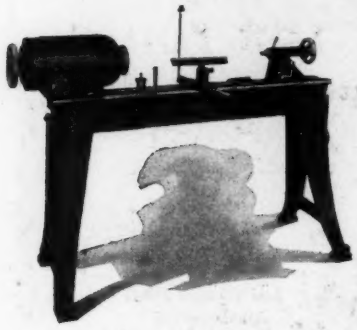
EXT-DFPA This grade of Douglas Fir Plywood is made with waterproof glues for permanent outdoor work such as garden cut-outs, siding, signs, bird houses, etc. Ideal for all types of boats.

PLYSCORD Use this grade for sheathing, sub-flooring and wherever strength and rigidity but not perfect surfaces are required.

PLYFORM Excellent concrete form material. Serves as sheathing and lining combined. Gives smoother surfaces at lowest cost.

GENUINE DOUGLAS FIR PLYFORM Concrete Form Panel D F P A
GENUINE PLYWALL Douglas Fir Plywood WALLBOARD D F P A
SPECIFY DOUGLAS FIR PLYWOOD BY THESE "GRADE TRADE-MARKS"
PLYPANEL D.F.P.A.
EXT.-D.F.P.A.
GENUINE PLYSCORD SHEATHING D F P A
DOUGLAS FIR PLYWOOD
Real Lumber
MADE LARGER, LIGHTER
SPLIT-PROOF
STRONGER

"OLIVER" SPEED LATHES MEET ALL THE REQUIREMENTS



No. 51-K Adjustable Speed Motor Headstock

LATHE

Here is a most modern, efficient and reliable safety speed lathe. Flexible, easy to operate, built to stand many years of hard service, this lathe will pay its way many times. Entire control mechanism is in the motor. It can be adjusted to run at speeds between 600 and 3,600 r.p.m.—at any speed desired.

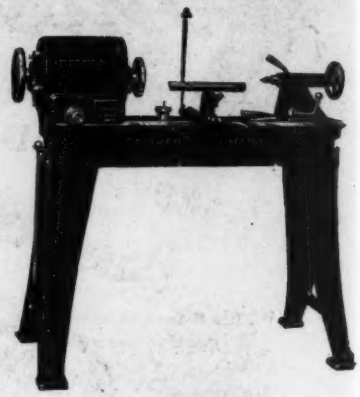
School shop training to meet present day industrial requirements calls for practical dependable woodworking equipment. Machines and tools of the kind used in industry are essential in the school shops to help the students in their trade training.

Oliver speed lathes, both the Four Speed and Adjustable Speed Motorheads, are used extensively in industry and will be found in many school shops.

In addition to the Oliver speed lathes illustrated and described here, the Oliver line of equipment includes

Wood Lathes, Sanders (Belt, Disk or Spindle), Boring Machines, Mortisers, Tenoners, Shapers, Circular Saw Benches, Band Saws, Band Saw Brazers, Jig Saws, Surface Planers, Jointers Wood Trimmers, Oilstone Tool Grinders, Woodworkers Vises, Glue Heaters, Knives, Saws, Metal Spinning Lathes, Electric Glue Heaters.

Oliver Machinery Company
Grand Rapids, Michigan, U.S.A.



No. 51 Four Speed Motor Headstock

LATHE

This speed lathe has a unique new type "sliding control." It can be set at any one of the four speeds; 600, 1,200, 1,800 or 3,600 r.p.m. It includes all safety devices, modern in design and construction, but built for service. Used in industry and many schools.

LEADERSHIP IN QUALITY AND DESIGN TYPIFIES THE "OLIVER" LINE

ASSOCIATION NEWS

COMING CONVENTIONS

Pennsylvania State Association for Adult Education, October 4–6, at Altoona, Pa. Pres., J. O. Keller, Pennsylvania State College, State College, Pa. Secy., Dr. Albert A. Owens, Board of Public Education, 21st and Parkway, Philadelphia, Pa.

Kansas Vocational Teachers Association, November 1–2, at Topeka, Kans. Pres., O. A. Hankhamer, Kansas State Teachers College, Pittsburg, Kans. Secy., F. E. Carpenter, 1406 E. 27th St., Topeka, Kans.

New England Industrial-Arts Teachers-Association, November 1–2, at Rutland, Vt. Pres., Richard Ballau, Providence, R. I. Secy., Willis B. Anthony, 109 Lincoln St., Fitchburg, Mass.

Iowa Vocational Association, November 7, at Des Moines, Iowa. Pres., Nina B. Johnston, Board of Education, Sioux City, Iowa. Secy., H. W. Carmichael, Board for Vocational Education, Des Moines, Iowa.

Iowa Industrial-Arts Association, November 7–9, at Des Moines, Iowa. Pres., E. H. Christensen, Cedar Rapids, Iowa. Secy., William Mayo, Des Moines, Iowa.

Wisconsin Industrial-Arts Association, November 7–9, at Milwaukee, Wis. Secy., Roy R. Van Duzee, West Allis High School, West Allis, Wis.

Virginia Vocational Association, November 22, at Richmond, Va. Pres., Dowell J. Howard, Winchester, Va. Secy., Linscott Ballentine, Stonewall Apts., Danville, Va.

♦ The much discussed youth problem and national defense—their relation to vocational education—will form the centerpiece of the coming convention of the American Vocational Association to be held in San Francisco next December.

On a recent visit to San Francisco, L. H. Dennis, executive secretary of the association, met with California leaders in vocational education and named John F. Brady, president of the California Teachers Association, as chairman of the San Francisco committee to arrange the convention.

Preceding the general meeting in San Francisco will be gatherings of state directors of vocational education who will meet on Friday and Saturday, December 13 and 14. These will be followed by Sunday morning meetings of state supervisors, city directors, and trade-school principals. The main convention of the Association will open at the Fairmont Hotel, San Francisco, on Monday, December 16, and continue through December 18.

Other California educational leaders who are active members of the convention committee include John C. Beswick of Sacramento, executive officer of the California Commission for Vocational Education; Dr. Ira W. Kibby, chief of the Bureau of Business Education, State Department of Education; Julian A. McPhee, San Luis Obispo, chief of the Bureau of Agricultural Education, State Department of Education; and Mack Stoker, supervisor of vocational education, University of California.

♦ The annual banquet of Epsilon Pi Tau, celebrating the 99th Industrial-Arts Forum, was held in Columbus, Ohio, on August 14.

Preceding the banquet was the initiation of new members, the initiation team being comprised of John Allen Whitesel, Teachers College of Connecticut, New Britain, Conn.; Gordon O. Wilber, Oswego Normal School, Oswego, N. Y.; George C. Decker, State Teachers College, Buffalo, N. Y.; Harold A. Huntington, A and M College, Stillwater, Okla.; Thomas Ewing French, Ohio State University, Columbus, Ohio; Harold G. Palmer, State Teachers College, Cedar Falls, Iowa; Elliott C. Hutton, Senior High School, Tucson, Ariz.; Harold H. Kirk, The Langley School, Washington, D. C.; and faculty sponsor, William E. Warner, National Secretary of the Fraternity, Ohio State University, Columbus, Ohio.

The toastmaster at the banquet was Robert W. Haws, president, Alpha Chapter, Roosevelt School, Hamilton, Ohio. Among those present were Anthony Marinaccio, Henry Barnard School, Hartford, Conn.; William D. Stoner, Miami University, Oxford, Ohio; Rudolph L. Schwanzle, State Teachers College, Pittsburg, Kans.; and Roman M. Hammes, Board of Education, Davenport, Iowa.

The fraternity keys were presented to Gerald F. Bassler, Knoxville, Tenn.; Raymond W. Cheney, Five Points, Ohio; Edward K. Clerk, Hillsboro, Ohio; William C. Frye, Jr., Corry, Pa.; Howard Grove, Ada, Ohio; Arthur G. Henke, Iowa City, Iowa; Harold E. McKee, Bedford, Ohio; Franklin B. Moss, Toledo, Ohio; Robert L. Peterson, Clay City, Ill.; Howard Riegger, Toronto, Ohio; Audrey Rex Skomp, Rocky River, Ohio; and Virgil Thompson, Barberton, Ohio.

Burl Neff Osburn, Laureate Member of the Fraternity, State Teachers College, Millersville, Pa., then introduced William Charles Blakey, vice-president and sales manager, American Education Press, Columbus, Ohio, who delivered an address on "Oriental Architecture and Artifacts."

♦ The Sixth Annual Convention of the New England Industrial Arts Teachers Association will be held at Rutland, Vt., November 1 and 2.

A representative from the State Department of Education in each state will speak on the industrial arts in his state during the Friday forenoon program. The first session of 12 round tables will be held Friday afternoon. The banquet meeting will be on Friday evening. The round-table discussions will be continued Saturday forenoon. The general theme at the round-table meeting will be "Developments in Industrial Arts." Following the luncheon Saturday noon there will be an address by a prominent speaker on industrial arts.

(Continued on page 22A)

NEW!

A "honey" of a sander for class project work!

SKILSAW Zephyrplane Jr.

2 1/4 IN. BELT SANDER

ONLY $49.50

• This smaller, more compact "ZEPHYRPLANE JUNIOR" was developed especially to provide students with a streamlined easy-to-handle belt sander—it's big enough for most school project work and it makes sanding FUN . . . not a slow, tedious job! Lighter, perfectly balanced, speeds up work and produces a better finish with less effort. Safety switch prevents accidental starting. Plugs into light socket.

Skilsaw Belt Sanders are also made in 3 in. and 4½ in. belt sizes for heavier project work and for maintenance sanding of blackboards, desks, stair treads, etc.

SKILSAW, INC.
5033A ELSTON AVENUE, CHICAGO

36 East 22nd St., New York • 182 Main St., Buffalo • 52 Brookline Ave., Boston • 15 S. 21st St., Philadelphia • 2902 Euclid Ave., Cleveland • 2124 Main St., Dallas • 918 Union Street, New Orleans • 1253 South Flower Street, Los Angeles • 2065 Webster Street, Oakland • 29 North Avenue, N. W., Atlanta • Canadian Branch: 85 Deloraine Ave., Toronto.

• This "touch-control" lever releases tension on the belt so that it can be quickly and easily replaced.

• Note the small high-speed, endless link belt that transmits maximum motor power to the drive pulley.

"THIS WILL WORK THE SAME WAY FOR YOU!"

"It used to be that every time the boys in my classes used solder in their work I had my hands full. Few of them could get the right results.

"Then I heard about this Kester Flux Filled Solder and tried it out. From then on soldering was a cinch for all the boys. The nuisance of separate fluxes was eliminated, and their metal-working skill improved rapidly."

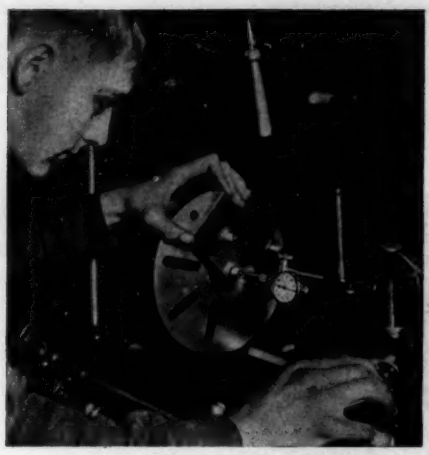
The same thing will happen in your classes when you make Kester Flux-Filled Solder a standard material. The handy self-contained flux in the core of the solder itself insures perfect results. And you have the extra satisfaction of teaching your students a practical working knowledge of a material widely used throughout industry.

Order a trial supply of Kester Flux-Filled Solder from your wholesaler or write to the address below.

KESTER SOLDER COMPANY

4257 Wrightwood Ave. . . . . Chicago, Ill.
Eastern Plant: . . . . . Newark, N. J.
Canadian Plant: . . . . . Brantford, Ont.

KESTER
FLUX-FILLED SOLDER



Learning the precision method of centering holes with a Starrett Dial Test Indicator and Toolmaker's Buttons.

AMERICA needs this young man . . .

. . . But it can use him only if his training is well-founded and complete. That means he must know modern methods, modern machines and modern precision tools.

The sooner you let him work with Starrett Tools, the sooner he will become acquainted with the tools that are standard equipment in shops and plants the country over.

AIDS to ACCURACY

Let Starrett Educational Sets help teach your boys to use precision tools. Fourteen blueprinted pages, each illustrating a different tool, trimmed and punched to fit a standard 8 x 10½ notebook. Furnished to students and instructors at cost—10 cents per set.

THE L. S. STARRETT CO., ATHOL, MASSACHUSETTS, U. S. A.

World's Greatest Toolmakers—Manufacturers of Hacksaws Unexcelled—Steel Tapes, Standard for Accuracy—Dial Indicators for Every Requirement

Standardize on

(Continued from page 20A)

The association has secured as its guest speaker, Dr. Harry S. Ganders, Dean of the School of Education, Syracuse University. His challenging message regarding the important and essential contributions that industrial arts must make in general education will be gladly heard by industrial-arts instructors from all of the New England States and by a number of school superintendents.—*Willis B. Anthony.*

♦ The University of Maryland Industrial Education Club held its third annual dinner meeting on the campus on July 24 with 108 persons present. All areas of education were represented, particularly industrial education and guidance personnel.

Among special guests were the following: Retiring Dean W. S. Small, University of Maryland; Dean Harold Benjamin, University of Maryland; Charles F. Willis, assistant superintendent, Baltimore, Md.; Lawson J. Cantrell, assistant superintendent of schools, Washington, D. C.; John J. Seidel, director of vocational education, Baltimore, Md.; Leonard Miller, director of guidance, Rockland County, N. Y.; James L. Reid, president, Industrial Education Club, University of Maryland; Harold Clark, director of vocational education, Washington, D. C.; T. H. Taliaferro, Dean of the Faculty, University of Maryland; Geary Eppley, Dean of Men, University of Maryland; George F. Pollock, alumnus secretary, University of Maryland; Glen D. Brown, professor of industrial education, University of Maryland; Albert G. Packard, supervisor of vocational industrial education, Baltimore, Md.; Riley S. Williamson, head, technical dept., Baltimore City College; and Ralph Gallington, assistant professor of industrial education, University of Maryland.

Dr. Carroll Shartle, Chief of the Analysis Section, U. S. Employment Service, selected for his topic on this occasion, "Occupational Relationship and the Education Implications." Dr. Shartle gave a most enlightening address and answered questions following his discourse.

The Industrial Education Club is a young but progressive organization of the leading industrial education men in the state of Maryland. The July meeting was one of the high-light activities on the campus and was one of the most inspiring ever held by the club. The entire affair was ably handled by Chairman Nicholas Nides, assisted by E. L. Longley, Herbert C. Logsdon, Paul Bruehl, Karl Young, Roger McDermott, and Loren Murray.

The program consisted of vocal solos by Professor Harlan Randall and music by the all industrial-education men orchestra, namely, John Horn, Hobert Horn, Robert Schmidt, and William Schoenhaar.

Dean Benjamin paid a glowing tribute to retiring dean, W. S. Small, and James L. Reid, president of the Industrial Education Club, made the presentation speech to accompany the remembrance gift tendered the retiring educator.

Glen D. Brown then introduced Dr. Carroll Shartle, who spoke on "Occupational Relationships and Educational Implications."—*Herbert C. Logsdon.*

♦ At the National Student Graphic Arts Society Conference, held at Rochester, N. Y., July 2, 1940, the following awards were made in the Fourth Annual Scrapbook Contest.

The judges were: Harry Hillman, Chicago; Howard N. King, Typographer, Intertype Corp.; and Harold E. Sanger, Chicago School of Printing.

Junior-High-School level: 1) Graphic Arts Club, Arsenal Junior High School, Pittsburgh, Pa., Everett W. Reiter, sponsor. 2) Graphic Arts Club, Jefferson Intermediate School, Detroit, Mich., Edward W. Kurtz, sponsor. 3) The Explorers' Club, Masonic Home and School, Fort Worth, Tex., Roy U. Lane, sponsor. 4) Graphic Arts Club, Gladstone Junior High School, Pittsburgh, Pa., W. C. Hagan, sponsor.

Senior-High-School level: 1) Graphic Arts Club, Washington High School, Rochester, N. Y., George T. Hart, sponsor. 2) Graphic Arts Club, Masonic Home and School, Fort Worth, Tex., Clarence B. Worsham, sponsor. 3) Graphic Arts Club, Johnstown High School, Johnstown, Pa., J. B. Coyle, sponsor.

Vocational or Trade-School level: 1) The Art Printer's Club, Masonic Home and School, Fort Worth, Tex., Fred W. Miller, sponsor and director. 2) Graphic Arts Club, New York School of Printing, J. Henry Holloway, principal. 3) Paso Del Norte Graphic Arts Society, El Paso Technical Institute, El Paso, Tex., William Van Gasbeek, sponsor. 4) Graphic Arts Club, Timken Vocational High School, Canton, Ohio, Chester A. Lyle, sponsor.

The Grand Award of the American Type Founders silver cup for the best scrapbook on any level, went to The Art Printer's Club, Masonic Home and School, Fort Worth, Tex., Fred W. Miller, sponsor. This large loving cup now becomes the possession of this club since they won it last year. For the next year there will be another cup provided for the contest.

Besides Ribbon Awards to all the contestants, J. J. Metz, editor, INDUSTRIAL ARTS AND VOCATIONAL MAGAZINE, Milwaukee, Wis., provided subscriptions to that magazine for the three firsts. These go to the following schools: Graphic Arts Club, Arsenal Junior High School, Pittsburgh, Pa., Everett W. Reiter, sponsor. Graphic Arts Club, Washington High School, Rochester, N. Y., George T. Hart, sponsor. The Art Printer's Club, Masonic Home and School, Fort Worth, Tex., Fred W. Miller, sponsor.

♦ The annual meeting of the Newark, N. J., Industrial Arts Teachers Association was held on June 8 at Pinney's Grove, N. J.

SUMMER-SCHOOL NOTES

♦ The 1940 summer session at The Stout Institute, Menomonie, Wis., was attended by a total of 455, of whom 192 were graduate students. The enrollment was made up of students from 33 states, Hawaii, and Canada.

NEW Instructors

NEW Classes

NEW Surroundings

But the Same OLD Problem—To Make the Work Interesting

To All You New Instructors:

Our Educational Program covering the various types and uses of Sandpaper is now entering its fourth year. If you are not familiar with its scope, write to our Educational Service Department for full details. You will be supplied any one (or all if you want them) of the following units comprising the program up to this date:

Lecture Course on Coated Abrasives—66 pages fully illustrated
Educational Wall Chart—36″ x 46″ (65 natural color views)
Box of Physical Samples
Wall Chart 14″ x 18″ of Industry's Woodworking Abrasives
Wall Chart 14″ x 18″ of Coated Abrasives for Metal Working

To Our Instructor Friends of the Past:

If your charts have become worn or soiled we will gladly replace them with fresh ones on request.

BEHR-MANNING (DIVISION OF NORTON COMPANY) **TROY, N. Y.**

Makers of Quality Coated Abrasives Since 1872

NORTON ABRASIVES

IA100

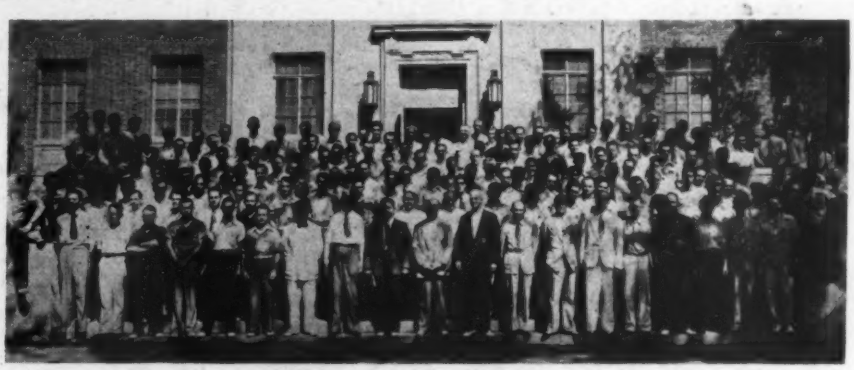
Vocational courses, during this summer session, were given by Guy J. Ehart, director of vocational and adult education, Janesville, Wis.; T. S. Rees, director of vocational and adult education, Racine, Wis.; Eiffel A. Holm, director of vocational and adult education, Wausau, Wis.; and Frank B. Jewson, co-ordinator, School of Vocational and Adult Education, Superior, Wis.

Other courses were given by Roy R. Van Duzee, in charge, Safety Education, supervisor industrial arts, public schools, West Allis, Wis.; Blanche Carrier, assistant professor of education, Northwestern University, Evanston, Ill.; C. L. Wetzel, vocational teacher trainer, Board of Education, St. Louis, Mo.; and Olive M. Stone, Richmond Professional Institute, College of William and Mary, Richmond, Va.

The special speakers and conference leaders this year included: Donald McGibeny, radio news commentator: Russell Wright, news photographer, world traveler, and lecturer; Curtis McDougall, editor, author, educator, and lecturer; A. H. Edgerton, director of guidance, University of Wisconsin, Madison; Raymond A. Voight, housing manager, Parklawn Management Office, Milwaukee, Wis.; Dora M. Rude, supervisor of home economics, Wisconsin State Board of Vocational and Adult Education; Joseph K. Folsom, professor of economics and sociology, Vassar College, Poughkeepsie, N. Y.; and Amy Louise Hunter, chief of the Bureau of Maternal and Child Health, Wisconsin State Board of Health.

During the fifth week of the summer session a Driver Clinic was conducted at The Stout Institute by Adolph Harbort, in charge of Driver Clinic, Safety Division, Wisconsin Motor Vehicle Dept., Madison, Wis. It was given a fine reception.

♦ During the 1940 summer session, at the Pennsylvania State College, State College, Pa., the visiting faculty members and special lecturers included: Lindley H. Dennis, Executive Secretary of the American Vocational Association; Elmer W. Christy, director of industrial arts, Cincinnati, Ohio; Charles W. Sylvester, director of vocational education, Baltimore, Md.; H. S. Tate, head, department of industrial education, Clemson College, S. C.; Irwin S. Noall, director of practical arts and vocational education, Salt Lake City, Utah; Lynn A. Emerson, head, department of industrial education, Cornell University, Ithaca, N. Y.; Joseph W. Fleming, senior supervisor, trade training and practical arts, Pittsburgh public schools; Lane Ash, State Department of Public Instruction, Harrisburg, Pa.; Kenyon S. Fletcher, Illinois State Normal University, Normal, Ill.; Stanley J. Pawelek, head, department of industrial arts, Winona State Teachers College, Winona, Minn.; J. Herbert Kissinger, Public Schools, Reading, Pa.; Arthur B. Wrigley, state supervisor of industrial education, Trenton, N. J.; Wayne E. Steiner, public schools, Sunbury, Pa.; and W. M. J. Moore, of U. S. Department of Labor, Federal Apprentice Committee, Washington, D. C.



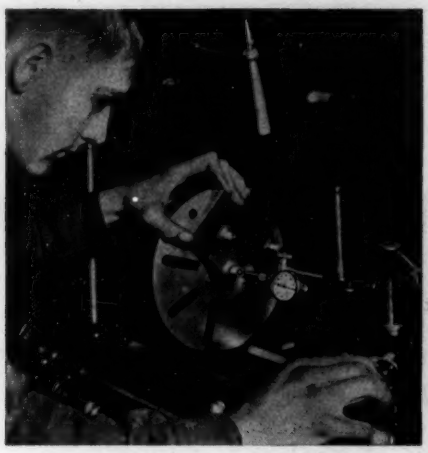
Graduate and undergraduate students and summer session faculty in industrial education at the Pennsylvania State College, State College, Pa.

♦ The Universal School of Handicrafts, RKO Building, Radio City, reports the current summer session to be the best in the school's history, the month of July having shown a 300 per cent increase over the same month last year. Many of the students are school and college teachers from all over the United States.

Since the school was founded five years ago, over 2,600 students have been trained. The school quarters were enlarged this spring to provide full facilities for the enlarged summer groups. A new school catalog has just been printed and will be mailed to all those making requests for information.

♦ Students and faculty members of the Iowa State College 1940 summer session, Ames, Iowa, report a very satisfactory summer school. There was a very substantial increase in enrollments, and the quality of the work was good. Under-

(Continued on page 25A)



Learning the precision method of centering holes with a Starrett Dial Test Indicator and Toolmaker's Buttons.

AMERICA needs this young man . . .

. . . But it can use him only if his training is well-founded and complete. That means he must know modern methods, modern machines and modern precision tools.

The sooner you let him work with Starrett Tools, the sooner he will become acquainted with the tools that are standard equipment in shops and plants the country over.

AIDS to ACCURACY

Let Starrett Educational Sets help teach your boys to use precision tools. Fourteen blueprinted pages, each illustrating a different tool, trimmed and punched to fit a standard 8 x 10½ notebook. Furnished to students and instructors at cost—10 cents per set.

THE L. S. STARRETT CO., ATHOL, MASSACHUSETTS, U. S. A.

World's Greatest Toolmakers—Manufacturers of Hacksaws Unexcelled—Steel Tapes, Standard for Accuracy—Dial Indicators for Every Requirement

Standardize on

(Continued from page 20A)

The association has secured as its guest speaker, Dr. Harry S. Ganders, Dean of the School of Education, Syracuse University. His challenging message regarding the important and essential contributions that industrial arts must make in general education will be gladly heard by industrial-arts instructors from all of the New England States and by a number of school superintendents. — *Willis B. Anthony.*

♦ The University of Maryland Industrial Education Club held its third annual dinner meeting on the campus on July 24 with 108 persons present. All areas of education were represented, particularly industrial education and guidance personnel.

Among special guests were the following: Retiring Dean W. S. Small, University of Maryland; Dean Harold Benjamin, University of Maryland; Charles F. Willis, assistant superintendent, Baltimore, Md.; Lawson J. Cantrell, assistant superintendent of schools, Washington, D. C.; John J. Seidel, director of vocational education, Baltimore, Md.; Leonard Miller, director of guidance, Rockland County, N. Y.; James L. Reid, president, Industrial Education Club, University of Maryland; Harold Clark, director of vocational education, Washington, D. C.; T. H. Taliaferro, Dean of the Faculty, University of Maryland; Geary Eppley, Dean of Men, University of Maryland; George F. Pollock, alumnus secretary, University of Maryland; Glen D. Brown, professor of industrial education, University of Maryland; Albert G. Packard, supervisor of vocational industrial education, Baltimore, Md.; Riley S. Williamson, head, technical dept., Baltimore City College; and Ralph Gallington, assistant professor of industrial education, University of Maryland.

Dr. Carroll Shartle, Chief of the Analysis Section, U. S. Employment Service, selected for his topic on this occasion, "Occupational Relationship and the Education Implications." Dr. Shartle gave a most enlightening address and answered questions following his discourse.

The Industrial Education Club is a young but progressive organization of the leading industrial education men in the state of Maryland. The July meeting was one of the high-light activities on the campus and was one of the most inspiring ever held by the club. The entire affair was ably handled by Chairman Nicholas Nides, assisted by E. L. Longley, Herbert C. Logsdon, Paul Bruehl, Karl Young, Roger McDermott, and Loren Murray.

The program consisted of vocal solos by Professor Harlan Randall and music by the all industrial-education men orchestra, namely, John Horn, Hobert Horn, Robert Schmidt, and William Schoenhaar.

Dean Benjamin paid a glowing tribute to retiring dean, W. S. Small, and James L. Reid, president of the Industrial Education Club, made the presentation speech to accompany the remembrance gift tendered the retiring educator.

Glen D. Brown then introduced Dr. Carroll Shartle, who spoke on "Occupational Relationships and Educational Implications." — *Herbert C. Logsdon.*

♦ At the National Student Graphic Arts Society Conference, held at Rochester, N. Y., July 2, 1940, the following awards were made in the Fourth Annual Scrapbook Contest.

The judges were: Harry Hillman, Chicago; Howard N. King, Typographer, Intertype Corp.; and Harold E. Sanger, Chicago School of Printing.

Junior-High-School level: 1) Graphic Arts Club, Arsenal Junior High School, Pittsburgh, Pa., Everett W. Reiter, sponsor. 2) Graphic Arts Club, Jefferson Intermediate School, Detroit, Mich., Edward W. Kurtz, sponsor. 3) The Explorers' Club, Masonic Home and School, Fort Worth, Tex., Roy U. Lane, sponsor. 4) Graphic Arts Club, Gladstone Junior High School, Pittsburgh, Pa., W. C. Hagan, sponsor.

Senior-High-School level: 1) Graphic Arts Club, Washington High School, Rochester, N. Y., George T. Hart, sponsor. 2) Graphic Arts Club, Masonic Home and School, Fort Worth, Tex., Clarence B. Worsham, sponsor. 3) Graphic Arts Club, Johnstown High School, Johnstown, Pa., J. B. Coyle, sponsor.

Vocational or Trade-School level: 1) The Art Printer's Club, Masonic Home and School, Fort Worth, Tex., Fred W. Miller, sponsor and director. 2) Graphic Arts Club, New York School of Printing, J. Henry Holloway, principal. 3) Paso Del Norte Graphic Arts Society, El Paso Technical Institute, El Paso, Tex., William Van Gasbeek, sponsor. 4) Graphic Arts Club, Timken Vocational High School, Canton, Ohio, Chester A. Lyle, sponsor.

The Grand Award of the American Type Founders silver cup for the best scrapbook on any level, went to The Art Printer's Club, Masonic Home and School, Fort Worth, Tex., Fred W. Miller, sponsor. This large loving cup now becomes the possession of this club since they won it last year. For the next year there will be another cup provided for the contest.

Besides Ribbon Awards to all the contestants, J. J. Metz, editor, INDUSTRIAL ARTS AND VOCATIONAL MAGAZINE, Milwaukee, Wis., provided subscriptions to that magazine for the three firsts. These go to the following schools: Graphic Arts Club, Arsenal Junior High School, Pittsburgh, Pa., Everett W. Reiter, sponsor. Graphic Arts Club, Washington High School, Rochester, N. Y., George T. Hart, sponsor. The Art Printer's Club, Masonic Home and School, Fort Worth, Tex., Fred W. Miller, sponsor.

♦ The annual meeting of the Newark, N. J., Industrial Arts Teachers Association was held on June 8 at Pinney's Grove, N. J.

SUMMER-SCHOOL NOTES

♦ The 1940 summer session at The Stout Institute, Menomonie, Wis., was attended by a total of 455, of whom 192 were graduate students. The enrollment was made up of students from 33 states, Hawaii, and Canada.

NEW Instructors

NEW Classes

NEW Surroundings

But the Same OLD *Problem—To Make the Work Interesting*

To All You New Instructors:

Our Educational Program covering the various types and uses of Sandpaper is now entering its fourth year. If you are not familiar with its scope, write to our Educational Service Department for full details. You will be supplied any one (or all if you want them) of the following units comprising the program up to this date:

Lecture Course on Coated Abrasives—66 pages fully illustrated
Educational Wall Chart—36″ x 46″ (65 natural color views)
Box of Physical Samples
Wall Chart 14″ x 18″ of Industry's Woodworking Abrasives
Wall Chart 14″ x 18″ of Coated Abrasives for Metal Working

To Our Instructor Friends of the Past:

If your charts have become worn or soiled we will gladly replace them with fresh ones on request.

BEHR-MANNING (DIVISION OF NORTON COMPANY) **TROY, N. Y.**

Makers of Quality Coated Abrasives Since 1872

NORTON ABRASIVES

IA100

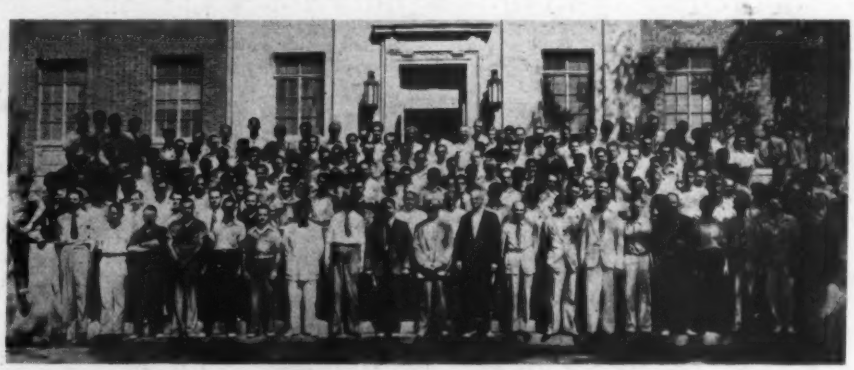
Vocational courses, during this summer session, were given by Guy J. Ehart, director of vocational and adult education, Janesville, Wis.; T. S. Rees, director of vocational and adult education, Racine, Wis.; Eiffel A. Holm, director of vocational and adult education, Wausau, Wis.; and Frank B. Jewson, co-ordinator, School of Vocational and Adult Education, Superior, Wis.

Other courses were given by Roy R. Van Duzee, in charge, Safety Education, supervisor industrial arts, public schools, West Allis, Wis.; Blanche Carrier, assistant professor of education, Northwestern University, Evanston, Ill.; C. L. Wetzel, vocational teacher trainer, Board of Education, St. Louis, Mo.; and Olive M. Stone, Richmond Professional Institute, College of William and Mary, Richmond, Va.

The special speakers and conference leaders this year included: Donald McGibeny, radio news commentator: Russell Wright, news photographer, world traveler, and lecturer; Curtis McDougall, editor, author, educator, and lecturer; A. H. Edgerton, director of guidance, University of Wisconsin, Madison; Raymond A. Voight, housing manager, Parklawn Management Office, Milwaukee, Wis.; Dora M. Rude, supervisor of home economics, Wisconsin State Board of Vocational and Adult Education; Joseph K. Folsom, professor of economics and sociology, Vassar College, Poughkeepsie, N. Y.; and Amy Louise Hunter, chief of the Bureau of Maternal and Child Health, Wisconsin State Board of Health.

During the fifth week of the summer session a Driver Clinic was conducted at The Stout Institute by Adolph Harbort, in charge of Driver Clinic, Safety Division, Wisconsin Motor Vehicle Dept., Madison, Wis. It was given a fine reception.

♦ During the 1940 summer session, at the Pennsylvania State College, State College, Pa., the visiting faculty members and special lecturers included: Lindley H. Dennis, Executive Secretary of the American Vocational Association; Elmer W. Christy, director of industrial arts, Cincinnati, Ohio; Charles W. Sylvester, director of vocational education, Baltimore, Md.; H. S. Tate, head, department of industrial education, Clemson College, S. C.; Irwin S. Noall, director of practical arts and vocational education, Salt Lake City, Utah; Lynn A. Emerson, head, department of industrial education, Cornell University, Ithaca, N. Y.; Joseph W. Fleming, senior supervisor, trade training and practical arts, Pittsburgh public schools; Lane Ash, State Department of Public Instruction, Harrisburg, Pa.; Kenyon S. Fletcher, Illinois State Normal University, Normal, Ill.; Stanley J. Pawelek, head, department of industrial arts, Winona State Teachers College, Winona, Minn.; J. Herbert Kissinger, Public Schools, Reading, Pa.; Arthur B. Wrigley, state supervisor of industrial education, Trenton, N. J.; Wayne E. Steiner, public schools, Sunbury, Pa.; and W. M. J. Moore, of U. S. Department of Labor, Federal Apprentice Committee, Washington, D. C.



Graduate and undergraduate students and summer session faculty in industrial education at the Pennsylvania State College, State College, Pa.

♦ The Universal School of Handicrafts, RKO Building, Radio City, reports the current summer session to be the best in the school's history, the month of July having shown a 300 per cent increase over the same month last year. Many of the students are school and college teachers from all over the United States.

Since the school was founded five years ago, over 2,600 students have been trained. The school quarters were enlarged this spring to provide full facilities for the enlarged summer groups. A new school catalog has just been printed and will be mailed to all those making requests for information.

♦ Students and faculty members of the Iowa State College 1940 summer session, Ames, Iowa, report a very satisfactory summer school. There was a very substantial increase in enrollments, and the quality of the work was good. Under-

(Continued on page 25A)

Valuable to Every Instructor

It's brand new — not only provides a complete listing of all types of finishes for school use, but also gives informative description and valuable information regarding each product and its specific application.

You'll find this a real authoritative text on finishes. Your copy is now ready. Send for it today.

You can save time and money by buying now on one order. Let us submit bids on your requisitions for school finishing supplies.

YOU CAN COUNT ON CAMPBELL

M. L. CAMPBELL Company

"Fine Finish Leadership for 25 Years"

704 E. 19th St. KANSAS CITY, MO.

ELEMENTARY MECHANICAL DRAWING
for
HIGH SCHOOLS

by William W. Klenke *and* Charles J. Hayes

- . . . . To develop an understanding of the fundamental principles of Mechanical Drawing.
- . . . . To increase the ability to visualize problems in three dimensions.
- . . . . To create skill in producing drawings in accordance with drafting room practice.
- . . . . To enable the student to think for himself through the presentation of projects and instructional subject-matter.

This new volume, superbly planned, written, and illustrated, is designed for the beginning student in high schools, trade schools, and vocational schools. A second volume by the same authors, entitled ADVANCED MECHANICAL DRAWING FOR HIGH SCHOOLS, will be published in October.

245 *pages.* 6 x 9, *cloth,* $1.60

Send for an examination copy on approval

INTERNATIONAL TEXTBOOK CO.
Scranton, Pennsylvania

FOR SUCCESSFUL SCHOOL SHOP WORK

GLUE at the RIGHT TEMPERATURE *Always*

HOLD-HEET *Electric* GLUE POTS
with AUTOMATIC THERMOSTAT CONTROL

NEVER TOO HOT

•

NEVER TOO COLD

•

WRITE FOR PRICES and 10 day Free Trial offer

Here's the ideal glue pot for school use. The automatic thermostat control keeps the glue at just the proper temperature for successful gluing—with a variation of less than 1°. That means continuous, uninterrupted service with no danger of gummy glue from underheating or spoiled glue from overheating.

FULLY AUTOMATIC

Any student can operate HOLD-HEET, for there's nothing to regulate—nothing to forget—no water jacket to boil dry. Just plug into any light socket.

BUILT TO LAST

Heavy welded steel body, sturdy construction thruout, and guaranteed long-life heating element make HOLD-HEET good for years of dependable efficient service.

RUSSELL ELECTRIC COMPANY
364 W. Huron St. Chicago, Illinois

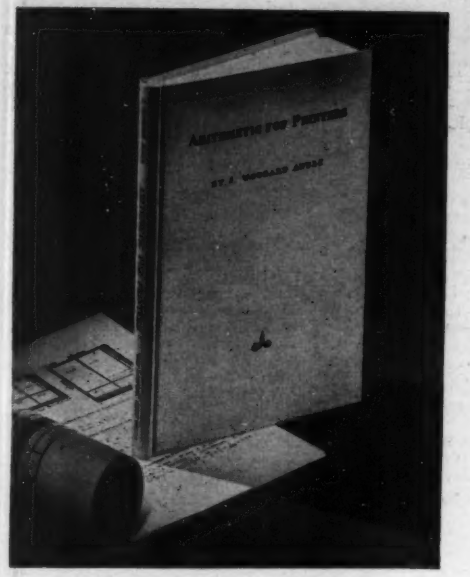
INSTRUCTORS STUDENTS

"Go Western" this year. See how neat your printing job can be when you use hi-grade envelopes at moderate prices.

You buy with confidence when you deal with a reputable house of over 32 years in the envelope trade.

20,000,000 envelopes in stock for immediate use. Prices and samples gladly furnished. Satisfaction guaranteed.

WESTERN STATES ENVELOPE CO.
1616 W. PIERCE ST. MILWAUKEE, WIS.



"Instructor's Key Manual for use with Arithmetic for Printers" is available without charge (teachers only) with a quantity order.

"I know of nothing that I consider comparable to it."

ARITHMETIC FOR PRINTERS

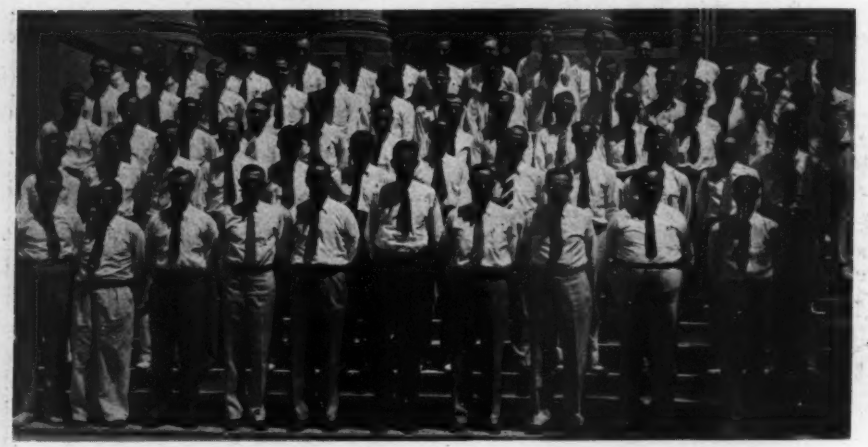
By J. Woodard Auble

Instructor in Printing, Arsenal Technical Schools, Indianapolis, Indiana

IN this thorough text on the arithmetic for printers the student is given basic information followed by intensive drill. Stress is placed on calculations important to printers, such as spacing, copyfitting, paper, planning the job, estimating, etc. Its over 1300 practical problems have been carefully selected from the computations the man in the print shop makes daily. The printers usual method of making these computations is fully explained. This usable text was written by a practical printer experienced in teaching arithmetic to printing students. Suggestions from many teachers in this field are embodied and the book has been thoroughly tried out.

180 pages. Price $1.72. Quantity discounts.

A Publication of* THE MANUAL ARTS PRESS *Peoria, Illinois



Industrial Education Summer Session of 1940, Iowa State College, Ames, Iowa

(Continued from page 23A)

graduate as well as graduate courses were offered during both of the six-week terms. A variety of shop courses were made available to all. Assisting Dr. Thomas A. Hippaka were guest professors L. H. Alberty, director of industrial and vocational education, Lincoln, Nebr.; Dean Clyde A. Bowman, Stout Institute, Menomonie, Wis.; John Paustian, member of the faculty of the University of Nebraska; Prof. Lowell L. Carver, Prof. Earl S. Baird, Prof. H. L. Kooser, and Prof. Arthur P. Twogood.

Master's degrees were conferred upon: Leland A. Benz, Ames, Iowa; Carl J. Beinert, Muscatine, Iowa; Walter E. Grauel, Mascoutah, Ill.; William V. Heldreth, Lexington, Ill.; Ira H. Johnson, Mankato, Minn. (spring term); Earl R. Peoples, Rock Island, Ill.; Lyle J. Shaw, Escanaba, Mich.; G. L. Steinhoff, Beaver Dam, Wis.; Allen J. Sherman, Spring Valley, Ill.; Cyrus B. Taylor, Webster Groves, Mo.; Edward R. Thomas, Lake Geneva, Wis.; F. H. Thompson, Muncie, Ind. (spring term); Ralph E. Weber, Ottawa, Ill.; and Henry White, Lockport, Ill.

NEWS NOTES

♦ Important changes in the industrial-education curricula have been made recently at the University of Minnesota. The four-year schedule leading to the S.B. degree has been considerably broadened in line with recent trends in industrial arts. In addition to the Master of Arts degree, the Master of Education degree is to be awarded. Each type of degree has distinct entrance qualifications and each has two plans or patterns of work. There are available four separate program styles from which to choose at the Master's level. Any person or institution may procure mimeographed briefs by writing to Dr. Homer J. Smith at the University of Minnesota, Minneapolis, Minn.

♦ A series of leaflets on occupational trends and probable employment opportunities in 1940 and 1941 is announced by Occupational Index, Inc., New York University, New York City. The first five in the series, now available, concern aircraft manufacture, Diesel-engine occupations, beauty culture, printing, and air conditioning and refrigeration. Each leaflet is a collation of the opinions of such competent observers as personnel officers, placement directors, officers of professional, trade, and labor organizations, and heads of training institutions. Single copies, 25 cents. Cheaper in quantities.

♦ The new gymnasium project at Seymour, Ind., originally started as a WPA project in 1937, was reopened recently by WPA authorities. It is planned to complete it by January 1. This gymnasium also includes accommodations for industrial-arts, music, and agriculture departments. McGuire and Shook, architects, are in charge of the completion of the building.

The Board of Education is contemplating the extension of industrial-arts and other practical courses, so that they can accommodate a larger number of students who will not go to college. This will necessitate a larger teaching force and more equipment.

♦ Armour Institute of Technology and Lewis Institute which have operated as separate schools for more than 40 years at Chicago were consolidated and are now known as the Illinois Institute of Technology.

Henry P. Heald, who has headed the Armour Institute for two years, was selected president of the Illinois Institute of Technology. James B. Cunningham was named chairman of the new institution and Alex D. Bailey vice-chairman.

(Continued on page 29A)

ADVERTISING PAGES REMOVED

SHOP EQUIPMENT NEWS
New Products—Publications

Skilsaw Announces New Disc Sanders

Three new important additions to the well-known line of Skilsaw Disc Sanders are being announced by Skilsaw, Inc., 5035A Elston Ave., Chicago, Ill.

Model "SP" is a 2-speed heavy-duty sander and polisher—specially developed for sanding, polishing, and buffing metals. When operating at a speed of 4200 r.p.m. with a 7-in. disc, it provides a maximum of sanding efficiency. When changed to 1300 r.p.m., the tool is ideal for use with felt rubbing pads or lamb's wool polishing bonnets for rubbing down lacquered surfaces and other polishing operations. A simple gear shift makes it very easy to change from one speed to the other. Eight heavy-duty ball bearings mounted on all shafts make possible carrying maximum loads and insure quiet operation and long life. Model "SP" is 18½ in. long and weighs 14¾ lb.

Model "H2" is a 2-speed heavy-duty sander which provides real economy whereever sanding work is constant in nature. A 9-in. disc is first used at a speed of 2700 r.p.m.; then, when the outer edge of the disc becomes worn, it is resized to a 7-in. diameter using a special disc trimmer which is provided with this sander. The smaller disc is then mounted on the alternate 7-in. pad and is used at a speed of 4200 r.p.m. Eight heavy-duty ball bearings mounted on all shafts give this tool greater efficiency and longer life. Model "H2" is 19½ in. long and weighs 16 lb.

Model "SL" is an extra heavy-power unit that can handle a wide variety of heavy-duty sanding, grinding, and surfacing operations. It operates at a no-load speed of 5000 r.p.m. which is the speed recommended by grinding wheel manufacturers as the most practical for 6-in. wheels to insure fastest production and longest life. Model "SL" may be used with various sanding pads, grinding wheels, wire cup brushes, and other accessories in the Skilsaw line. The tool is 18 in. long and weighs 15 lb.

The Electric Moto-Saw

The new electric Moto-Saw developed by the Dremel Mfg. Co., 14th and Clark Sts., Racine, Wis., is an ingenious jig saw which weighs only 17 ounces, and runs on 110–120 volt, 50- or 60-cycle current. It is only a trifle heavier than a

hand scroll saw, is well balanced, runs at a speed of 7,200 strokes per minute, and cuts at an average speed of 1 f.p.m. through ⅛ to ¾ in. medium hardwood.

It may be safely handled by an eight-year-old and is exceedingly low in first cost, upkeep, and in cost of operation.

A descriptive circular can be had on request.

NEW POT-HARDENING AND MELTING FURNACES

The Johnson Gas Appliance Co. of Cedar Rapids, Iowa, has just announced two new pot-hardening and melting furnaces, for case hardening, tempering, perlitonizing and melting non-ferrous metals. Both are designed for salt, cyanide, and lead hardening

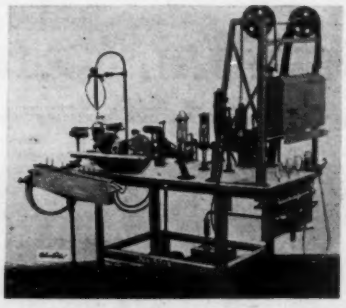
These Johnson Furnaces are especially adaptable for use in small shops, and save heating large furnaces for a few small parts. They are also in wide demand by tool- and diemakers and small plants for case hardening, and by pattern- and modelmakers for melting small quantities of aluminum, brass, and nickel silver. They are strongly constructed with shields heavily lined with insulating refractory. Due to the large combustion space below and around the pot, the flame does not impinge directly against it. These models are furnished with steel pot, lid, derrick for lifting lid, and with Johnson blowers. Temperatures are easily regulated, and the gas consumption is low.

No. 500, the smaller model, makes use of a 6 by 8-in. steel pot, and Model No. 550, the larger, uses a 8 by 10-in. steel pot.

Further information on these models may be had on request.

The Eisler Laboratory Unit No. 57–X

The Eisler Engineering Company of 740–770 South 13th Street, Newark, N. J., has recently developed a Laboratory Unit which fulfills the need of schools, colleges, experimental and research laboratories for a compact machine.



The unit is complete in itself and capable of performing all operations required in the construction of Electronic tubes, Incandescent lamps, Radio tubes, Neon tubes, Television tubes, Fluorescent tubes, Mercury switches, Ampoules, Vials, and similar products.

A few of the many items included in this unit are: glass cutter, flare and stem maker, electric spot welder, tube sealer and annealer, vacuum pump, etc.

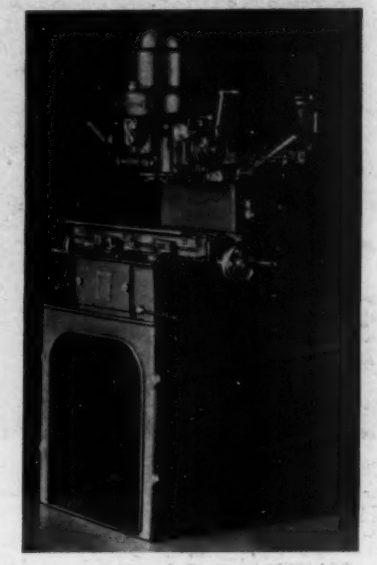
The unit is completely wired and piped for gas and air. It can be supplied with a glass manifold, mercury aspirator, special gas-oxygen burners, gas and air boosters, and other miscellaneous items when required.

New Cincinnati No. 0-8 Vertical Milling Machine

Ideal for the rapid and accurate milling of work that can best be handled on a small vertical type milling machine, the new Cincinnati No. 0-8 Vertical Milling Machine announced by The Cincinnati Milling Machine Co., Cincinnati, Ohio, is particularly profitable for either rapid production or job lot production of small parts of firearms, sewing machines, refrigerators, cash registers, business machines, and similar units.

Equipped with both hand and power table movements and with adjustable vertical spindle, the machines are powered with a one-horsepower motor for the spindle drive and one-fourth-horsepower motor for the table drive. The machine is mounted on a cabinet base providing a convenient table working height for the operator.

Complete automatic lubrication is a feature of this machine. A plunger-type pump, driven from the table-feed driveshaft, lubricates all moving parts. Oil is forced to the upper spindle drive bearings, then by splash and gravity to all parts of the vertical spindle head. Lubricant is fed to a reservoir in the bed from which it flows by gravity to the hand-scraped table bearing ways, feed gears, and table mechanism. A small pocket-like reservoir at the front of the vertical spindle



head provides lubricant for the spindle bearings by means of a needle valve and drop sight gauge. A supply of lubricant is maintained at all times in this reservoir and insures immediate lubrication for the spindle bearings when the machine is started.

The machine can be equipped with a built-in cutter coolant pump mounted on the inside of the bed and driven by chain from the table-feed power shaft.

An automatic backlash eliminator can be supplied at extra cost.

The machine weighs, when equipped with the standard cabinet base, approximately 1,450 lb.

The floor space occupied by each machine is approximately 13.9 sq. ft., which makes it possible to group several makes in a small area.

New Clutch Catalog

The Carlyle Johnson Machine Co., 52 Main St., Manchester, Conn., have issued a new catalog covering their standard as well as their super type of Johnson clutches.

Full description of both types is given and a tabulated dimension sheet giving the sizes of all clutches manufactured by the firm is included.

Accompanying the catalog is a bulletin giving the dimensions of the new Maxitorq multiple-disk-type clutch which is available both single and double, and in the dry- as well as wet-plate types.

Catalog and bulletin are available on request.

NEW CONTINENTAL MACHINES FOLDER

Recently published by Continental Machines, Inc. of Minneapolis, Minn., is an interesting folder entitled "Eight Different Jobs Show Doall Advantages Over 8 Basic Cutting Methods."

This folder shows by actual photographs the comparison of the Doall contour sawing method of removing metal with such conventional machining methods as shaping, turning, milling, nibbling and torch cutting. The comparison is made very interesting by showing the precision work swiftly completed on the Doall machines and the savings in time and material which result.

This folder may be obtained by written request directly from the manufacturer.

(Continued on page 29A)

GENERAL SHOP WOODWORKING

Revised *Enlarged*

Text for beginners in woodworking courses. For unit shop as well as general shop. Instruction, supplemented by many clear illustrations, on basic fundamentals.

New units on Our Common Woods and Upholstery and practical projects have been added.

Write today. ***V. C. Fryklund—A. J. LaBerge***

PUBLISHED IN BLOOMINGTON, ILLINOIS BY

McKNIGHT & McKNIGHT

For Pewter it's Burgess!

As distributors for the National Lead Company we invite your inquiries or orders for Hoyts genuine Pewter. We carry a full stock of sheets in gauges 14 to 18 and also discs in all sizes from 2" to 14" in diameter. Hoyts Pewter contains no lead and is proven for best results.

Ask for our free catalog listing our other metals and craft supplies — Leather, Pottery, Basketry, Archery, Plastics and many more.

BURGESS Handicraft DIVISION OF BURGESS BATTERY COMPANY

117 North Wabash Avenue **Chicago, Illinois**

Immediate Attention to Requirements for

NATIONAL DEFENSE PROGRAM CLASSES

WEBER

DRAWING MATERIALS
AND DRAFTING SUPPLIES

STUDIO, SCHOOL AND DRAFTING ROOM FURNITURE

Catalogue on Request

F. WEBER CO.

ARTISTS' MATERIALS — DRAWING MATERIALS

PHILADELPHIA, PA.

ST. LOUIS, MO. BALTIMORE, MD.

Patronize Your Nearest Weber Dealer

(Continued from page 26A)

Available Publications

The Cincinnati Milling Machine and Cincinnati Grinders, Inc., Cincinnati, Ohio, have the following publications available. They can be obtained for the asking.

1. "Milling Machine Practice"—a reprint of the section on this subject in Kent's *Mechanical Engineer's Handbook*.

2. "A Review of the Grinding Theories"—a reprint of an article prepared by Mr. Albert Dall, Research Engineer.

3. "Surface Broaching"—a reprint of the paper given before the American Society of Mechanical Engineers in the Machine Shop Practice Division by Messrs. Sol. Einstein and Millard Romaine.

4. "Precision Grinding"—a reprint of an article by Mr. A. Meals, formerly a specialist in centerless grinding, and now one of the specialists on milling, grinding, broaching, lapping, and die sinking.

5. "Hydraulics Cannot be Denied"—a reprint of an article which appeared in *Machine Design* and written by Messrs. Hans Ernst and Albert Dall.

6. "Machining with Single Point Tools"—a reprint of an article which appeared in two installments of *The Tool Engineer*, published by the American Society of Tool Engineers. This reprint will be available shortly.

The Apprentice in the National Defense Program

Defending America against aggression is a task all loyal Americans, old and young, are ready and willing to perform each according to his own ability. Some will go to the army, some to the navy, and still others will enlist in the air corps.

A good many capable citizens will be needed to produce the implements of war. These workers, skilled and semiskilled, form the backbone of a well-organized National Defense Program, because the army, navy, and air corps are absolutely useless without a steady stream of reliable equipment and supplies.

The student machinist may not be immediately concerned with the National Defense Program. Any protracted period of military activity, however, will see him called upon to contribute his valuable services to industry.

Furthermore, the demand for skilled machinists will not end as the need for strong defense measures diminishes. Instead, great quantities of peacetime commodities—neglected in the rush to produce defense weapons—will be needed immediately to satisfy the demand of a nation that prides itself on its high standard of living.

The necessity for adequate training, both for war and peacetime pursuits, and the existence of a ready market for the services of good machinists, has been strikingly emphasized by The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio, in its advertisement on the back cover of the September issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. Reprints of this advertisement, suitable for posting in conspicuous places in the industrial-arts shop, are available to instructors requesting them.

F. C. Gardner Dies

Fred C. Gardner, secretary-treasurer of E. C. Atkins and Co., Indianapolis, Ind., died late Sunday afternoon, July 28, in his home, 4131 North Meridian St. He had been ill a month.

Mr. Gardner had been associated with E. C. Atkins and Co. for 59 years, longer than any other member of the company's personnel. He had been secretary-treasurer of the company since 1900.

He was born in Farmer City, Ill., August 23, 1862. He came to Indianapolis when he was 17 years old and was employed a short time by the Indianapolis, Bloomington, and Western Railroad Co. He began his career with E. C. Atkins and Co. on July 1, 1881, as a general office helper.

He had actively served his community in the capacities of member of the City Council, Park Board, former treasurer of the state, county, and city Republican Committee, a delegate to the Republican National Convention in 1920 and a presidential elector in 1908.

Survivors are the widow; two daughters, Mrs. Jesse Fletcher of Indianapolis and Mrs. Robert K. McConnell of Northampton, Mass.; four grandchildren, Mary Elizabeth Fletcher and Lillian Fletcher, both of Indianapolis, and Robert K. McConnell, Jr., and Margaret Gardner McConnell, both of Northampton, and a sister, Mrs. Henry C. Martin of Indianapolis.

(News Notes continued from page 25A)

♦ American Education Week will be held this year from November 10 to 16. This is the 20th annual observance of this program. Because of present-day world conditions, the motto, "Education for the Common Defense" has been adopted as the slogan for this year.

♦ Winthrop Rockefeller was recently elected chairman of Air Youth of America, of New York City, the nonprofit educational agency which is seeking to stimulate interest in model-plane building and elementary aeronautics among the nation's youth. A nation-wide survey found that there were 1,500,000 to 2,000,000 model-plane enthusiasts in the country, but that they lacked a central organization to guide their efforts and provide technical assistance. Air Youth of America has no members, but operates through existing youth groups.

♦ The Chicopee, Mass., School Committee recently voted to establish a course in loom fixing to be conducted at the Chicopee Mfg. Company plant as a part of the trade-school program, pending approval by the state which will pay the cost of instruction. The course will be open, not only for employees of the Chicopee Mfg. Company, but to other qualified persons seeking the instruction.

♦ Thirty states now provide training in aviation in federally aided public schools, the U. S. Office of Education announced recently. The report of a survey reveals that 57 cities are providing aviation courses in 68 federally aided schools. Students in federally aided public school aviation classes have received instruction in many different divisions of aviation in subjects such as

(Continued on page 31A)

THE MARKET PLACE

STERLING STEEL FLASKS

Made of Specially Rolled Copper Bearing Rust-Resisting Steel Channel sections having a solid center Rib and Solid Sand Flanges at Top and Bottom.

Write for Catalog of Flasks and Other Foundry Equipment

STERLING WHEELBARROW CO., Milwaukee, Wis.

LOOMS, Table and Foot
Reed, Raphia, Handicraft Supplies

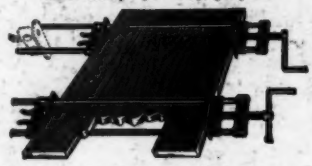
Send for catalog

J. L. HAMMETT CO.
CAMBRIDGE, MASS.

HARTFORD CLAMPS

Hartford Single and Double Bar, Self-Locking and Unlocking Clamps have been standard in most schools for over fifteen years.

Write for free catalog covering hand clamps for every purpose.



Note how the double bars keep the work from buckling.

HARTFORD CLAMP CO.
Bumside Connecticut

USE
AETNA PLYWOOD
For A Better Job

Good material means good workmanship! AETNA'S plywood is ideal for making furniture, novelties, and specialties in school vocational courses. AETNA has all standard sizes and thicknesses of fir, pine, gum, birch, oak, basswood, cedar, mahogany, walnut, and fancy woods. **Send for our free catalog,** and take advantage of our extra-quick service!

AETNA PLYWOOD & VENEER
1737 Elston Avenue **Chicago, Ill.**

LEATHERCRAFT

LEATHERS, LACING, TOOLS, ZIPPERS, SNAPS, ALL WOOL FELT, BEADS, WOOD PLAQUES, AND NEW FLEXIBLE WOODEN SOLE SANDLE KITS.

Schools send stamp for catalogue.

LAPCHESKE LEATHER COMPANY
1717 West 23rd Street **Des Moines, Iowa**

Industrial Furnaces
FORGES - MELTERS - OVENS

Complete Tables
BLOW PIPES
Suitable sizes for school shops
Write for complete information

American Gas Furnace Co.
ELIZABETH, N. J.

T. A. Foley Lumber Co.

We Furnish Schools With

Lumber, Panels, Dowels and Cedar Chests

PARIS, ILLINOIS

Specify

PAXTON

For highest quality in grade, texture and kiln drying.

Remember—the project can be no better than the materials from which it is made.

FRANK PAXTON LUMBER CO.
Des Moines Denver
Fort Worth Kansas City

BOIN LEATHERCRAFT STUDIOS
Specializing in
LEATHERS, TOOLS and FITTINGS
for Craft Groups in
SCHOOLS, CAMPS and INSTITUTIONS
Catalogue and Quotations on request
P. O. Box 91 Madison, New Jersey

CABINET HARDWARE — TOOLS AND SUPPLIES

Get acquainted with our complete line of nationally known hand tools, cabinet hardware, supplies and equipment. Write for catalog "k" and for school shop prices. No obligation.

LUSSKY, WHITE AND COOLIDGE
65-71 W. Lake St. Dept. C-10 · Chicago, Ill.

The only book devoted exclusively to

THE FLAT BOW

By W. Ben Hunt and John J. Metz

Shows beginners how to make flat bows, bowstrings, arrows, etc., illustrating the various processes. Also gives instructions for shooting.

Paper, 50 cents

THE BRUCE PUBLISHING COMPANY
706 Montgomery Bldg., Milwaukee, Wis.

NEW LEATHER PROJECTS

Ladies gloves, in kit form and with all the holes punched, are typical of the many new ideas brought you in the new 1941 Project Handbook. Educational yet practical projects from 5c up. Many with no tools required. Send today. No obligation. *For correct edition, give the grade you teach.*

Special: Genuine Russia tooling calf shoulders—chocolate, black or natural—app. 4 ft., $1.95 cash with order, while they last!

HORTONCRAFT 621 Capitol Ave. Hartford, Conn.

1896 — ORIGINAL **Toles Vises** — 1940

18 Models for Woodwork only
2 Actions — 3 Sizes
Write for Prices

W. C. TOLES CO.
Woodstock, Ill.

MASTER METAL BENDING TOOL

Makes Scrolls, Circles, Curves

For metal bending and wire forming. Accommodates metal up to 1 inch wide by ⅛ thick. Accurately adjustable by 1/16 inch. Widely used in school and craft shops. Obtainable at Hardware and Craft Supply Houses. Directions with each tool.

$2.75

Send for folder describing 25 Metal Projects and available Blue Prints.

LINDSLEY MFG. CO., Dept. 6, BRIDGEPORT, CONN.

ARCHERY MATERIALS
FOR THE SHOP

The L. C. Whiffen Company has specialized in archery materials for years. We have a thorough understanding of its problems. Our supplies are used in shop work all over the country. Our high standard of quality is nationally recognized. School shops are quoted special low prices. Write for illustrated catalogue.

L. C. WHIFFEN CO., Inc.
828 W. Clybourn St. Milwaukee, Wis.

POTTERY
KILNS—CLAYS—GLAZES
WRITE DEPARTMENT B FOR COMPLETE CATALOG
AMERICAN ART CLAY CO. INDIANAPOLIS

We manufacture a complete line of equipment:
COLLEGE GLASS working units for students and laboratory. SPOT WELDERS and A. C. ARC WELDERS. TRANSFORMERS, special and standard types. INCANDESCENT LAMP manufacturing equipment. RADIO TUBES, ex-ray, cathode ray, photo cells. ELECTRONIC EQUIPMENT, vacuum pumps, etc. NEON UNITS, blow torches and burners of all kinds. GENERAL GLASS working machines and ribbon burners.

EISLER ENGINEERING COMPANY
CHAS. EISLER, Pres.
767 So. 13th St. (Near Avon Ave.) Newark, New Jersey

EASIEST TOOL TO USE

BECAUSE IT HAS A *Flexible* SHAFT AND *Pencil-Size* HANDPIECE

Students will acquire new ease and skill with the **Foredom Flexible Shaft Tool.** Teachers will find instruction facilitated. **Foredom** offers "finger-tip" control for precision work in hard-to-reach places and for delicate jobs. Note the flexible shaft—the lightweight, pencil-size hand-piece. Versatile, can use over 300 accessories. Hundreds of uses: grinding, polishing, milling, engraving, sharpening, slotting, gem-setting, sawing, carving, cleaning, sanding, glass etching, finishing dies, molds, castings, etc., etc. Only $14.95 for the complete Portable Workshop, as illustrated.

YOURS ON 10-DAY FREE TRIAL

Order this Model 45 **Foredom** Flexible Shaft Workshop today. Enclose $14.95 check or M.O.—or, we can ship C.O.D. Try it for 10 days. If not completely satisfied, return set—we refund money at once. **Foredom**—fine tools since 1922 Write for Complete Catalog.

ONLY $14.95 including 50-piece Accessories Set

Foredom Electric Co., Dept. 173, 27 Park Pl., New York, N. Y.

PEWTER
FOR SPINNING

Circles—2" to 20" dia.—14-15-16-18 ga.
Sheets—18"x24"—12-14-15-16-18 ga.
Square Wires—1/16"-1/8"-3/16"-1/4" approx. sizes
Tubing—1/8"-3/16"-5/16"-1/2"—all inside dia.
Rods—3/16"-1/4"-3/8"-1/2"—approx. dia.
Hinges—1" and 5/8"
Slugs—1 1/4"-1"-7/8"-3/4"—dia. (in any thickness)
Pewter Solder—70/30—12 ga. round
65/35—Half Round
60/40—flat jewelers strip

Casting Metal for School Foundries
Send 6c in stamps for new teaching aids and information.

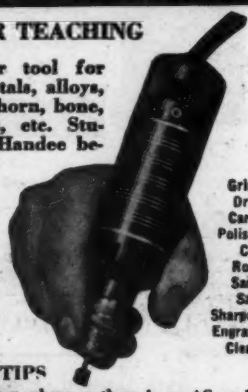
WHITE METAL
ROLLING & STAMPING CORP.

70 Moultrie St. Brooklyn, N. Y.
Telephones, EVergreen 9-4134-5-6

HANDEE TOOL OF 1001 USES

FOR EASIER TEACHING

Use this super tool for work on all metals, alloys, plastics, wood, horn, bone, linoleum, glass, etc. Students like the Handee because of its smooth, rapid response, enabling them to turn out better projects. Easy and safe for beginners.



Grinds
Drills
Carves
Polishes
Cuts
Routs
Sands
Saws
Sharpens
Engraves
Cleans

A POWER HOUSE AT YOUR FINGERTIPS

Portable—Set up shop wherever there is an AC or DC socket, 110 volts. Uses 300 quickly interchangeable accessories. The DeLUXE MODEL, shown above, weighs only 12 oz. Speed 25,000 r.p.m. $18.50 with 6 Accessories. STANDARD MODEL weighs 1 pound, 18,000 r.p.m. $10.75 postpaid with 3 Accessories.

HANDEE WORKSHOP

A complete and practical outfit for use with DeLuxe Handee — Lathe, Drill Press, Routers, Carver, Grinder, Polisher, Sanders, Saw, Shaper Table and 10 Accessories all for $35.00 delivered.

Order on 10 Days Trial or send for 64-page catalog of all Handee Products.

CHICAGO WHEEL & MFG. CO.
1101 W. Monroe St. Dept. IA Chicago, Ill.

☐ Send Free Catalog ☐ Standard Handee
☐ DeLuxe Handee on trial ☐ Handee Workshop

Name .....
Address .....

(Continued from page 29A)

aircraft mechanics, aircraft aluminum welding, aircraft designing, and aircraft drafting; aircraft electrics, aircraft inspection, aircraft manufacture, and aircraft sheet-metal fabricating. The instruction includes also trade mathematics, drawing, science, and blueprint reading; theory and maintenance of aircraft engines and lofting; aviation instruments, hydraulics; and propellers, motor dissembly, internal combustion engines; ground mechanics, airplane rigging, airplane servicing, and theory of flight.

♦ The Virginia, Minn., school system plans for further extension of their vocational trade-training program by the introduction of the building trades course and a general metals course under the Federal Government subsidy. The school district would save $798 per year by adding two new courses to the printing and auto-mechanics programs already being carried on under Smith-Hughes and George Deen aid programs.

Under Superintendent L. A. Lavine's proposal, the four trade courses would be held during the afternoon and the work would be carried on by the present shop staff. This will offer more senior-high industrial-arts courses and will give greater opportunities for high school and post-graduates in trade-training classes.

♦ Mantua Township Board of Education, Mantua, Ohio, has purchased a 24 x 60-ft. building from the Garrettsville school board. The class of 20 boys have a real workshop now, and a classroom which is equipped with cupboards, cabinets, overhead lights, and large windows. Mr. M. L. Rickley, the instructor, who specializes in vocational agriculture, will include in the course farm engineering, soil fertilization, animal husbandry, and farmshop work.

♦ The new East New York Vocational High School now under construction at Brooklyn, N. Y., will feature shops for the training of workers in the aviation, automotive, boat construction, and electrical industries.

The building will be three stories high and will accommodate almost 2,000 pupils. There will be an aviation department, shops for the construction and repair of airplane engines, metal wing, and plane surfaces, fuselage and rigging; an automotive department with advance auto service and chassis shops; boat construction and boat maintenance shops; electric motor and testing laboratory and elementary and advanced electric wiring shops. In addition, the school will have three machine shops, welding, printing, painting, radio and household appliance shops, sheet-metal, woodworking and patternmaking rooms, and two general shops.

The building is scheduled to be completed before the end of the year.

♦ An extracurricular study of the graphic arts in a press workshop was a new feature at the Bread Loaf School of English which opened its twenty-first session, under the auspices of Middlebury College, Vt., June 28. Over 50 students enrolled at the graduate school participated in the work.

Bread Loaf Printers is the name of the new Press located in a log cabin on the mountain campus at Bread Loaf. Frank DcWitt, instructor at the Rochester, N. Y., Athenaeum and Mechanics Institute, was in charge. Under his direction the Press produced two small volumes during the summer designed and written by students.

The Press was created at the suggestion of Robert Frost, New England poet, who has been a member of the Bread Loaf staff since it was started in 1920.

♦ East Texas State Teachers College, Commerce, Tex., is one of the 412 institutions in the United States which has contracted with the Civil Aeronautics Authority to establish student pilot-training units within its course of study. Ground classes and flight instruction began January 2, 1940. At the completion of the course, each student will be given a flight examination by the Civil Aeronautics Authority officials. Those passing this examination will receive a private pilot's certificate.

EASE OF READING, VISIBILITY AND VERSATILITY STRESSED IN THE MORE THAN 40 PRECISION MODELS.
Write for the New PRECISION 1941 Electrical and Radio Test Equipment Catalog

Address All:-EDUCATIONAL DIVISION

PRECISION TEST EQUIPMENT
INDUSTRIAL • LABORATORY • RADIO • TELEVISION

PRECISION APPARATUS COMPANY
647 Kent Avenue Brooklyn, New York
Export Div.: 458 Broadway, New York, U.S.A.
Cables: Morhanex

Detroit Public Library

THE MARKET PLACE

EASY TO WORK! TO SAND! TO GLUE! TO FINISH!

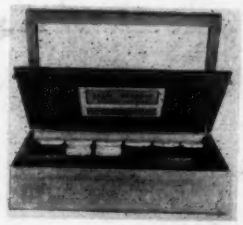
B-G LUMBER

— because it's soft-textured, and kiln-dried!

At our present low price scale, it's easy to buy, too. Give it a trial — and you'll see why it's the school favorite from coast to coast.

Make B-G your buying source for Supplies, too!

BRODHEAD-GARRETT CO.
"Supplying Schools in All 48 States"
CLEVELAND, OHIO



SILK SCREEN PRINTING OUTFIT $11.00

Complete with paints, silk, film, squeegee, knife, etc., and instruction manual. A professional set for school and home use. Designed by I. J. Biegeleisen.

150 Page Catalog free to Teachers

UNIVERSAL HANDICRAFTS SERVICE, Inc.
1267 Sixth Ave. (Suite 300) New York, N. Y.

ELECTRIC MOTOR PARTS FOR ALL MAKES

ALSO ALL MATERIALS AND TOOLS USED IN THE MOTOR REPAIR SHOP

Free Catalogue to Instructors

READING ELECTRIC CO., Inc.
200 William St. New York
227 W. Van Buren St. Chicago, Ill.

CLAMPS

GENUINE "Jorgensen" TRADE MARK REG. U.S. PAT. OFF.

You won't have trouble with genuine "Jorgensen" handscrews . . . they won't split or loosen, handles won't come off and the threads last indefinitely. Look for the "Jorgensen" on the jaws . . . it's your protection and guarantee.

Steel Bar Clamps—"Jorgensen" High Speed — stronger, faster, handier. More economical because first cost is no higher — often less—and they will serve you better.

"Pony" Fixtures . . . to make up clamps on ordinary pipe. No machine work or tools required. Make them up in any length desired.

"Pony"

ADJUSTABLE CLAMP CO. Write for Catalog
"The Clamp Folks"
424 N. Ashland Ave. Chicago, Ill.

KNOCKDOWN CEDAR CHEST

Foreign and Domestic Lumber and Veneers.
Send 10c today for Illustrated Catalog.
GILES & KENDALL CO., Decatur, Ala.

R·MURPHY STAY SHARP 1850 KNIVES

TRADE MARK — MADE SHARP AND STAY SHARP

Write for a complete Catalog.

For Sloyd and Manual Training work, there are no finer knives made than Robert Murphy's. Over 90 years of experience, research and experimentation enable us to offer knives of guaranteed quality.

Every blade is especially processed of the finest steel to stand the gaff of school shop use and STAY SHARP.

ROBERT MURPHY'S SONS CO.
AYER, Established 1850 MASS.

Meet TOM THUMB

Now A GENUINE **DUMORE LATHE GRINDER**

ONLY **$24.95**

Not a toy, but a full fledged precision grinder for school workshop . . . at the lowest price in Dumore history. The new Dumore Tom Thumb (No. 14) will grind to .0001". Internal capacity down to ⅛" and up to 2¼". Speeds 8,500 to 19,000 r.p.m. Weighs only 6¼ lbs. Write today for descriptive booklet.

THE DUMORE CO., Dept. 230-D, Racine, Wis.

CRAFTSMANUAL

Send 25c (stamps or coin) for introductory jumbo package of Monite Aircraft glue, and you will receive copy of our 16-page Craftsmanual complete with working plans, as a free gift.

Monite Waterproof Glue Co.
209 Monite Building
Minneapolis Minnesota

UMBER

We solicit your inquiries and orders for Ash — Hickory — Basswood — Maple — Poplar — Gum-wood — Red Cedar — Western Pine — Yellow Pine — Birch — Walnut — Chestnut — Elm — Oak — Cherry — Mahogany — Cypress. *Write to*

THE TEGGE LUMBER COMPANY
1500 West Bruce Street Milwaukee, Wis.

TANNEWITZ HIGH SPEED BAND SAWS

Used by the majority of leading industrialists for cutting Wood and Sheet Metal

Made in 4 Sizes From 24" Up — With
SAFETY TWIN BRAKES
TROUBLE-PROOF WHEELS
DEMOUNTABLE TIRES

Safest Band Saws on the Market. Write for Circular.

The TANNEWITZ WORKS
FRONT AVE. • GRAND RAPIDS, MICH.

SHELDON

Safety Underdrive

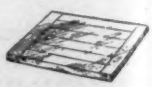
Back Geared, Screw Cutting
PRECISION LATHES

For schools, no lathe equals a Sheldon 4-speed Type "U" Underneath Pedestal Drive. Full bowl headstock and cabinet leg encloses all belts and pulleys. Speed changes are made by external shift levers, and cabinet is opened only for occasional oiling.

Write for catalog showing complete line of 10, 11 and 12 inch SHELDON Precision Lathes.

SHELDON MACHINE CO. INC.
1625 N. Kilbourne Ave. Chicago, U.S.A.

United States Blue Print Paper Co.
A complete line of Drafting Materials for Schools and Colleges



Let us quote your requirements

United States Blue Print Paper Co.
207 South Wabash Ave. Chicago, Illinois